Central-regional relation and diversity of regional innovation capacity

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Key questions

Why some regions move fast then other regions for innovation driven strategy?

Stage of development predicts the innovation pace: GDP per capital, the increase of GDP per capital will push the region to spend more R&D ; we find this does not work.

Development trajectory: your footprint predict what you do next.

Catch up theory(Lee, Liu): middle and west region will have more opportunity to catch in capability of innovation: is there a convergence of innovation capability in different regions?
Central vs regional government in China

- **Top down**: central government management is a top down way, emphasizing the central authority.

- **Bottom-up**, it also encourages regions to diversify development and learn by doing; such as extensively establish pilots and development zones; and have a high tolerance for regional competition (even directly or indirectly contribute to regional competition).

- Decentralization and regional competition stimulate a more credible commitment of regions and unleash regional vitality. (Qian & Weib gast, 1997)
Pace of Regional Decentralization

- Shenzhen opening (1978)
- Tax Sharing System Reform (1990)
- Rejuvenate the Old Northeast Industrial Base (1994)
- Pudong Opening (2000)
- Western Development (2003)
- ...
Regional autonomy and diversity

- **On the one hand**, regions must be **subordinated to the unified management** of central government and respond to central’s policy.

- **On the other hand**, regions **have autonomies and diversities**. Based on different resources, industrial foundations, capabilities and advantages, etc., regions diversify in development models.
  - **GDP-driven vs. innovation-driven**
  - **New industry vs. existing industry**
  - **Government-led vs. market-led**
  - **Policy for investment or talent people**
Regions are more and more important in NIS

Central and local government S&T appropriation

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Starting point: the change of innovation score

(China Regional Innovation Capability Report, LIU, 2013)

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Some up some down 2001-2012

East region:
Jiangsu up (4-1): stage of development?
Shanghai, 4-1

Middle region:
Hunan up (15-10), diffuse theory
Anhui: 17-9, diffuse theory
Jiangxi: 26-20 diffuse theory
Sanxi: 21-25 catch up and stage of development: failed.

Southwest region
Shangxi: 11-14, failed
Chongqing: 16-13 predicted

West region:
Mongolia (27-17), catch up theory
Guizhou: 29-23 catch up predict
Government-led vs. market-led:
Government-led vs. market-led
Distribution of government R&D investment in 2011
Demands from central government

From made in China to creation in China

From quantity of GDP to sustainable growth

From low level of industrialization to high level of industrialization: less energy using, less pollution, high value added
How do the regions respond?

GDP driven: investment driven on existing industry

Innovation driven: R&D investment and human resources irrelevant of their level of GDP per capital

Do what? New industry or existing industry

Policy for investment or talent people.

Who do it? Government or market led

Diversity of growth and catching up
Guangdong: market-led
江苏省企业研发投入、高技术产业产值、研发人员全时当量以及发明专利授权数排名稳居全国前列。
Jiangsu: mixed model: both government and market strongly led the innovation development in the region

Business R&D

Financing for R&D

Investment in new industry investment: such as photovoltaic industry ahead of central government

Investment in talent people not land
上海最近几年一直排名全国第四位，与江苏相比，上海的企业研发投入、高技术产业产值、研发人员全时当量等方面均落后。
Shanghai: government-led

Most of key indicators are stable for a long time

GDP per capital is high but not as predictor of investing for innovation

Respond central government more positively

SOE dominate and less role of private enterprises, this is the main obstacle for its innovation capability.
Jiangsu vs Shanghai 政府研发投入占全国的比重
Share of R&D Expenditure by government(%)
Jiangsu vs Shanghai 企业研发投入占全国的比重 Share of R&D Expenditure by firm(%)
Jiangsu vs Shanghai发明专利授权数占全国的比重
Share of Invention Patents Granted(%)
Jiangsu vs Shanghai研发人员全时当量占全国的比重
Share of total Full-time Equivalent of R&D Personnel

江

苏Jiangsu

上海Shanghai

安徽Anhui

湖南Hunan

重庆Chongqing

内蒙

古Neimenggu

江

西Jiangxi

福

建Fujian

贵

州Guizhou

吉

林Jilin

山

西Shanxi

广

东Guang

浙

江Zhejiang

2013/10/22
Jiangsu vs Shanghai 高技术产业产值占全国的比重
Share of Gross Output Value on High tech Industry(%)
重庆是典型的投资驱动模式，特别是近五年以来，比如外资增长率排名全国第一，人均固定资产投资额排名全国前列，但政府、企业在研发投入、技术改造投入方面处于全国中下游水平，排名在20位以下。
Chongqing: government-led

- More investment for fixed assets not for R&D and human resources
- But leapfrogging for IT industry
- HP played the role of leading goose to establish its notebook base in 2009, with 29 millions notebook production. Foxcom, and other Taiwanese OEM following HP to come to Chongqing.
- 80 million production capacity, a world base for notebook production
- Rebuilding a new Chongqing with about 800 billion yuan sales.
- New shipping and trade methods to reduce the costs of logistics
- Offshore finance
### IT production value in five regions

100 Billion Yuan

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安徽近两年总体排名上升，各指标排名均有提高。

安徽Anhui 17-9
近五年，山西Shanxi人均GDP逐年上升，但科技指标排名均呈下滑态势，创新能力总体还是下降的。
Shanxi: government-led

1980s, it was a region for coal energy, For thirty years, not change

Heavy chemical industry around coal.

Since 1990s, tried to diversify for material, equipment manufacturing, tourism, etc. but very slow.

GDP per capital has been increasing,

Limited investment for innovation and new industry but innovation capacity is decreasing.

SOE
近年来，内蒙古的人均GDP、企业技术改造投入、技术市场成交额增速较大，排名上升，引起创新能力总体提升。
Inner Mongolia: government-led

Energy plus metal, manufacturing and agriculture, chemical, etc,

Investment driven

Indicators for innovation is low, but high in west regions

State owned enterprises dominates
高技术产业产值增长率
Growth rate of gross output value on high tech industry(%)
Conclusion

Stage of development is not a good predictor for industry upgrading and innovation.

The call for innovation from central government gives the regional government the direction, but regional strategy based on their own capability and resources is the key for its development and innovation performance, so, decentralization matters.

The main tool for central government is the size and speed of GDP, this can lead different directions: reinforcing the existing industry or upgrading and introduce of new industry.
Conclusion

The call for innovation pushes local governments to speed more on R&D, it works, but the call for sustainable development is almost a failure as the output is public goods.

There is a divergence of government and market-led innovation development.

The mixture of government and market-led case (Jiangsu case) shows sustainable in innovation development in regional level.