Levels of Innovation Systems: competition or complementarity? The case of China

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1. Background

- Strengthening companies' innovation capabilities is regarded as the cure for the current economic downturn (OECD, 2010);

- Cultivating a benign environment for companies' innovation activities is top task for public sectors on different levels;

- Decentralisation has endowed local governments more autonomies in organising their local economic activities

- Traditional innovation studies had overwhelmingly concentrated on private sectors: companies' size; entrepreneurship; industrial sectors etc.

- Whereas the relational-return in economic geography welcomes a growing attention to the role of institutional factors and social capital;

- 'Learning region'; 'innovation milieu'; 'third Italy model'; 'local buzz'; and 'innovation system'

2. Theoretical framework

- 'Innovation system' refers to a collection of private and public actors, whose interactions would stimulating the processes of initializing, learning and diffusing economically useful knowledge. (Freeman,1987);

- First emerged on the national level (NIS) (Lundvall 1992; Nelson 2000) by tracing the economic performance of the UK, US, Japan;

- The growing internationalisation process, and its reinforced effect on regional concentration of economic activities further fashioned the idea of regional innovation system (RIS)

- Now the momentum towards decentralisation and localism in many countries should have directed attention towards the local configuration of innovation activities (LIS);

- Which nevertheless, is not the case so far. RIS assumes that the local level innovation activities could be completely incorporated into the regional level

- Furthermore, the cross-level innovation activities and resource flows between LIS, RIS, NIS are also less explored;

- These ignorance could be problematic as the innovation activities are analysed within a semi-closed geographical space
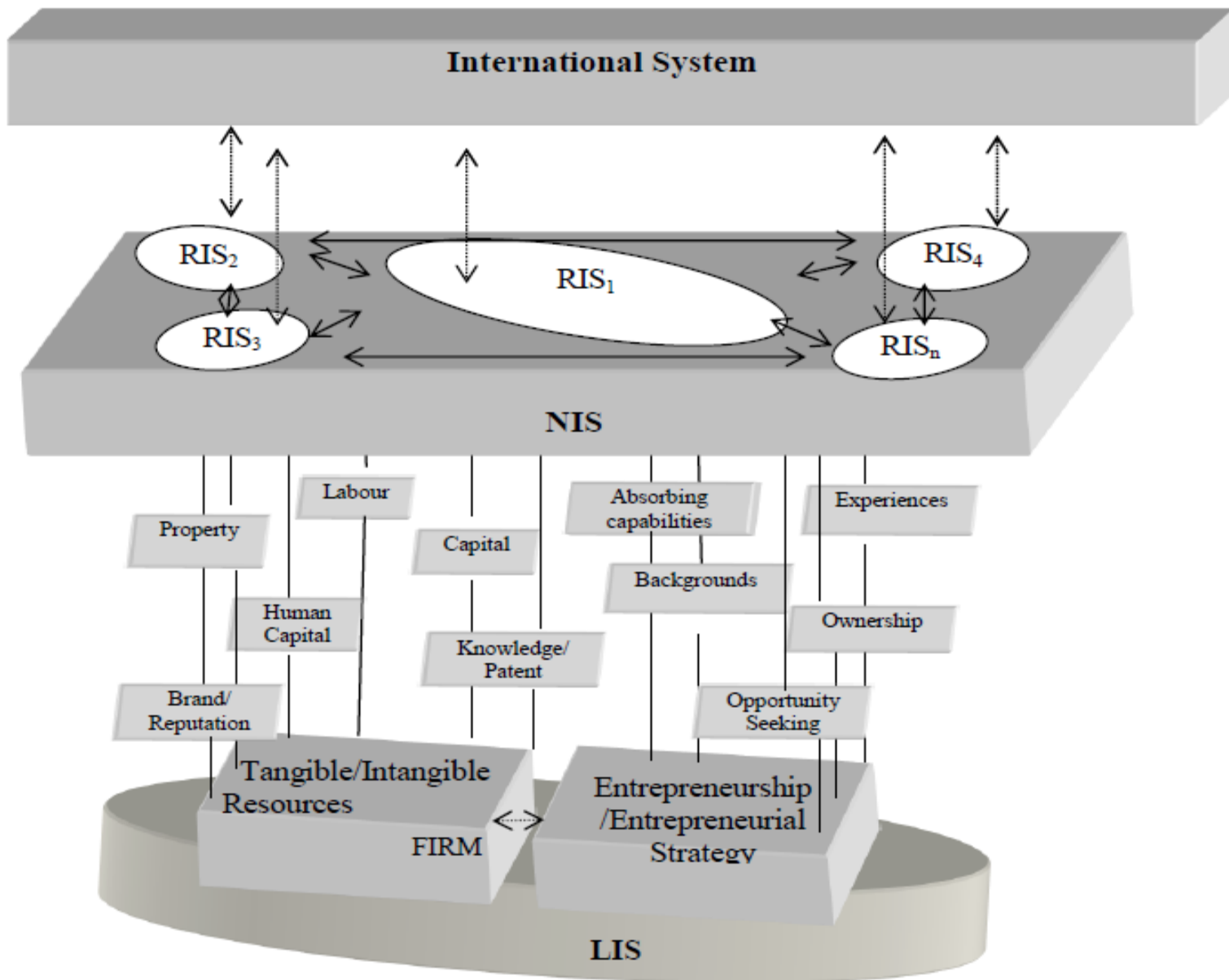
International System

RIS₂ **RIS₁** **RIS₄**

RIS₃ **RISₙ**

NIS

Property

Labour

Absorbing capabilities

Experiences

Capital

Human Capital

Backgrounds

Ownership

Knowledge/ Patent

Brand/ Reputation

Opportunity Seeking

Tangible/Intangible Resources

Entrepreneurship /Entrepreneurial Strategy

FIRM

LIS

Figure 1 The relationship between NIS, RIS, and LIS

- ISs on different geographical levels will have different 'fitness' for supporting companies' innovation activities and meeting their needs, a phenomenon that has not been fully explored before.

- On the macro-level, the fitness of an IS could be reflected by the overall innovation performance of its components in both private and public domains.

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3. Case study on China

- **Methodology**

- Fitness of ISs: approached by their industry productivities but not their overall innovation activities

- LIS: represented by the national-level science parks (SPs) in this country (By 2009, there were 54 national-level SPs hosted by 29 provinces)

- RIS: The provinces or municipalities (major cities) that host these SPs

- NIS: national average data.

- China Science & Technology Statistics (STS 2011), National Bureau of Statistics (2011) and 138 company survey in one SP were the main data sources

- Two composite indexes were calculated:

(a) Productivity comparison between RIS and NIS (vertical axis);

(b) Productivity comparison between LIS and RIS (horizontal axis)

(C) The multiplication between these two indexes gave the productivity comparison between LIS and NIS
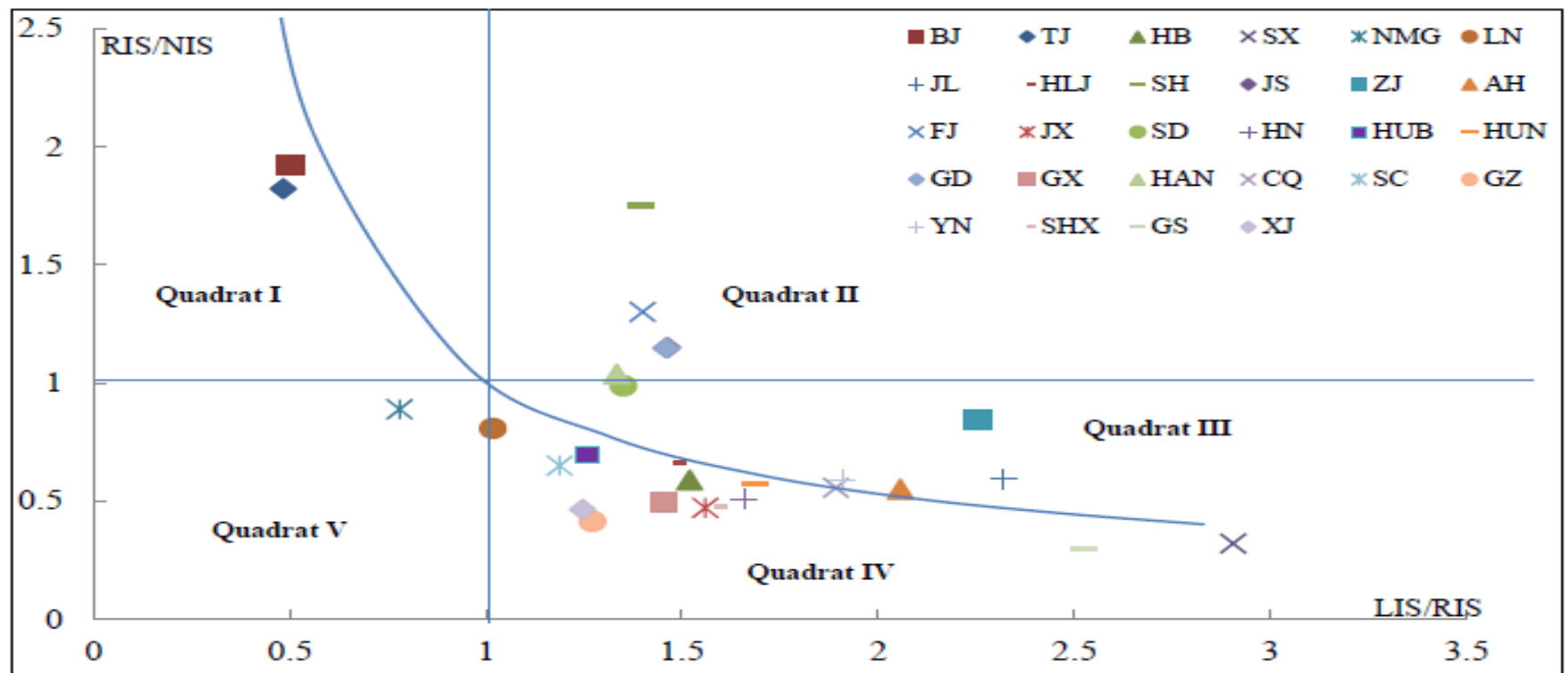

Figure 2 The relation between national, regional, and local innovation systems

Figure 3 Fitness comparisons between national, regional, and local innovation systems

Note: 1. ■: RIS> NIS > LIS; ■: LIS > RIS > NIS; ■:NIS > RIS > LIS;

■: NIS > LIS > RIS; ■: LIS > NIS > RIS

2. No data available for Tibet and Qinghai;

Table 1 Fitness comparison between national, regional, and local innovation systems

Quadrants	Features ('>'means better fit)	Provinces
I. Metropolitan scale innovative hubs	RIS > NIS > LIS	Beijing, Tianjin
II. Bottom-up innovation regions	LIS > RIS > NIS	Shanghai, Fujian, Jiangsu, Guangdong, and Hainan
III. Established local innovation spots	LIS >NIS > RIS (upper right of curve)	Jilin, Zhejiang, Anhui, Shandong, Chongqing, Yunnan
IV. Emerging local innovation spots	NIS > LIS > RIS (lower left of curve)	Hebei, Shanxi, Liaoning, Heilongjiang, Jiangxi, Henan, Hubei, Hunan, Guangxi, Sichuan, Guizhou, Shaanxi, Gansu, Xinjiang
V. Allocated growth regions	NIS > RIS > LIS	Inner Mongolia

4. Conclusion

- Previous simplistic assumptions on either competitiveness or embeddedness view of innovation systems should be refreshed;

- As each layers' innovation systems are partially independent and partially embedded with each other, it is highly likely that systematic fitness or synergy between different levels' ISs would vary as well.

- In China, it was found that provinces in China have clustered into five sub-groups. While the coastal regions generally had a better fitted RISs and LISs, the hinterland regions were largely over-shadowed by the influence of the NIS of China;

- Nevertheless, the SPs in these hinterland regions have built on their synergy as fertile land for companies' innovation activities;

- A place's economic strength and administrative power and autonomy are among the most crucial factors that could impact the relative fitness of ISs on different geographical levels

The end

Thank you

- Any questions?