

University/Research Institute-Industry Linkages in Two Chinese Cities: Commercializing Technological Innovation

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Outline

- Theoretical issues
- Historical background
- Current situation
- Beijing and Shenzhen
- Conclusion

Theoretical issues

- Innovation system and economy
- Role of universities and research institutes (URIs)
- URI-industry linkages

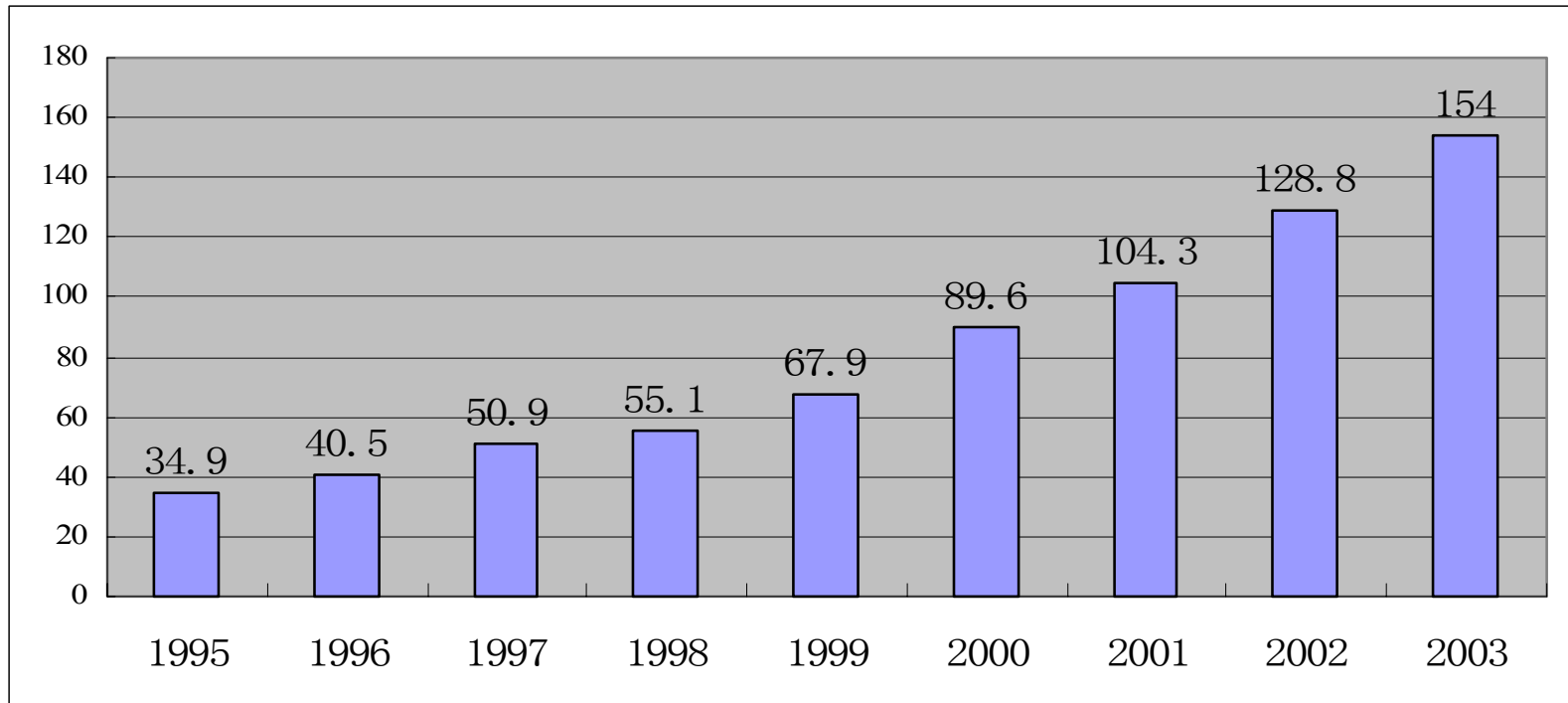
Historical background

- Before the 15th century: global leader
- The 15th—1949: China's decline and the Communist victory
- 1950's—1978: Socialist period
- Since 1978: Reforms

Reforms

- Market-oriented economy
- “Open door policy”
- Decentralization
- Private ownership
- Linkages between research and production
 - Torch program, high technology cluster, R&D centers

R&D Statistics (RMB Billion)



Year	1995	1996	1997	1998	1999	2000	2001	2002	2003
R&D Expenditure	34.9	40.5	50.9	55.1	67.9	89.6	104.3	128.8	154
R&D/GDP (percent)	0.6	0.6	0.68	0.7	0.83	1.0	1.09	1.23	1.31

Note: Data compiled from the China Science and Technology Statistics Net

Current situation (2003)

- R&D: RMB154 billion, 1.31% of GDP
- 53 national high-tech zones
 - Revenue: RMB2,094 billion (240 times than 1991)
 - Number of high-tech companies: 32,857 (13 times)
- Publication: Fifth (15th in 1990)
- Patent: Chinese patent applicants more than foreign applicants in China
- Technology contracts: RMB88 billion (9 times)

Things Have Changed in China and No Where More than Shenzhen

1980's



1990's



2000's



Source: Shenzhen Government Net

	Beijing	Shenzhen
Historical background	<ul style="list-style-type: none"> • Had a history as a city for two thousand years. • Served as the capital city in several dynasties. 	<ul style="list-style-type: none"> • Became a city in 1979.
City's Major function	<ul style="list-style-type: none"> • Capital city. • Political, cultural and S&T center of the country. 	<ul style="list-style-type: none"> • Special economic zone. • A successful model of the economic reforms.
Economic strength	<ul style="list-style-type: none"> • GDP in total is No.2 in the country. • GDP per capita was \$3074 in 2003. • Major industry: high-tech and service. 	<ul style="list-style-type: none"> • GDP in total is No.5 in the country. • GDP per capita was \$6510 in 2003. It remains the highest in the country. • Major industry: high-tech and manufacturing. • Affiliation with Hong Kong

Beijing

Shenzhen

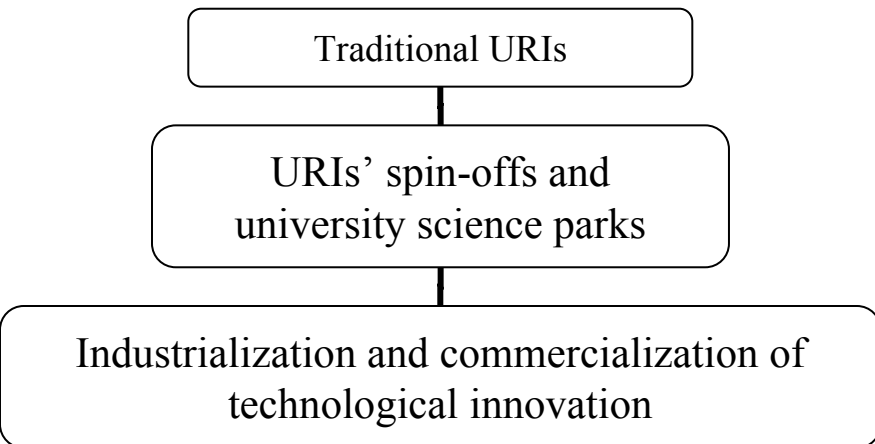
S&T strength	<ul style="list-style-type: none">•Center of the best URIs in the country.•R&D expenditure was RMB 25 billion in 2003.•URIs and MNC/indigenous high-tech enterprises are active in R&D.•R&D, publication, invention patent and technology contract value remain the highest in the country.	<ul style="list-style-type: none">•Lack of URIs before 1990's.•Set up the virtual campus and university town in late 1990's.•R&D expenditure was RMB 7 billion in 2003.•Local high-tech firms are active such as Huawei, ZTE.•Invention patent moved up to No.3 in the country in 2003.
High-tech cluster	<ul style="list-style-type: none">•Zhongguancun Science Park (ZGC).	<ul style="list-style-type: none">•Shenzhen High-tech Industrial Park (SHIP).

Beijing

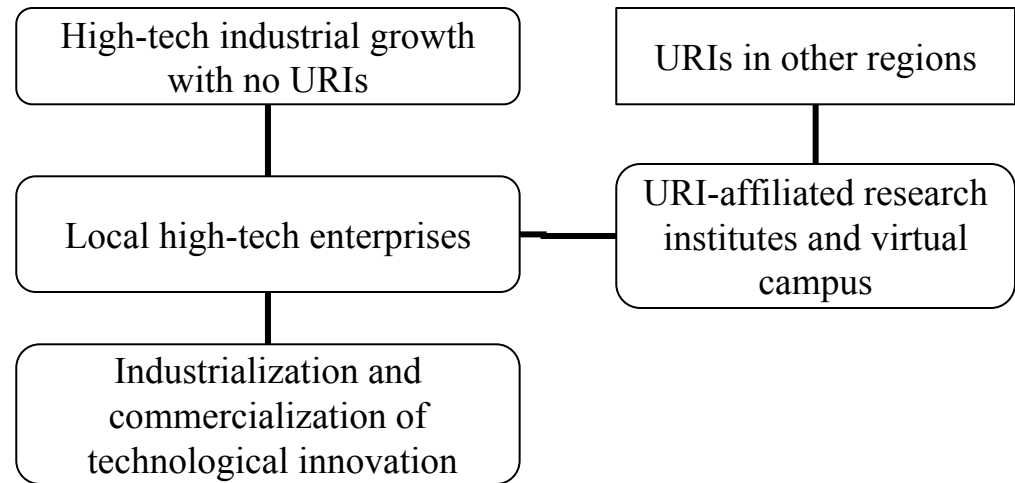
Shenzhen

URI	<ul style="list-style-type: none">•Elite URIs in the country such as THU, PKU, CAS.	<ul style="list-style-type: none">•THU, PKU, CAS started to set up research institutes or graduate schools in the middle and late 1990's.
URI-industry linkages	<ul style="list-style-type: none">•URIs are concentrated in ZGC.•Technology transfer activities through TLO offices at URIs.•URI-affiliated enterprises such as PKU's Founder, CAS's Lenovo, THU's Tongfang.•University science parks such as THU Science Park, PKU Science Park, BUAA Science Park.•Major mode: spin-off and university science park.	<ul style="list-style-type: none">•The virtual campus and university town are located in SHIP.•URI-affiliated research institutes serve as the bases of R&D, professional education, and technology transfer/industrialization.•Major mode: technology transfer and licensing through cooperation with local companies.

Beijing



Shenzhen



Conclusion

- URIs' contribution to China's economy
 - Education, research, advising government.
 - Technology commercialization
 - URI-affiliated firms
 - University science parks
 - Joint projects
 - Licensing
- Beijing and Shenzhen with different endowments develop different strategies
- Challenges