



清华大学中国科学技术政策研究中心

China Institute for Science and Technology Policy at Tsinghua University

Multinational R&D in China and its impact

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Outline



- Background
- General Findings-nationwide
- Special case-Beijing
- Special case-Universities
- Special case-patenting activities
- Discussions

Background-the trend



- The trend of R&D globalization and MNC R&D Centers in China:
- Our study in 1999 found over 30 MNC R&D centers by major MNCs;
- Ministry of Commerce's data for 2001 was less than 200;
- In 2005, government revealed that there are over 750 MNC R&D centers in China.

Background-issues



Debates and concerns:

- In developing countries such as China, there is a debate about the impact of MNC R&D activities:
 - spill-over vs. “suck-in” effects;
- In developed countries such as the US, there is also some concern:
 - First manufacturing. Now R&D, Are they going too far?

Background-objectives



- A follow up study of our 1999 study when we surveyed over 30 major MNC R&D centers around China (Xue etc.2000,2001,2002);
- Aimed at:
 - improving our understanding of MNCs R&D activities in China with a special focus on MNC's R&D centers in Beijing, Shanghai, and so on.
 - Improving our understanding of the impact of MNC activities on China's innovation system.

Background-Research methods



- The sample:
 - 335 MNCs in China out of 483 eligible companies from Business Week Global 1000;
- Research methods:
 - Phone interviews with 289 of these companies;
 - Questionnaires sent to MNC directors in Beijing and Shanghai; responses from Beijing have been processed; responses from Shanghai just came in;
 - In depth interviews were conducted with over a dozen directors of these R&D centers.

General Findings

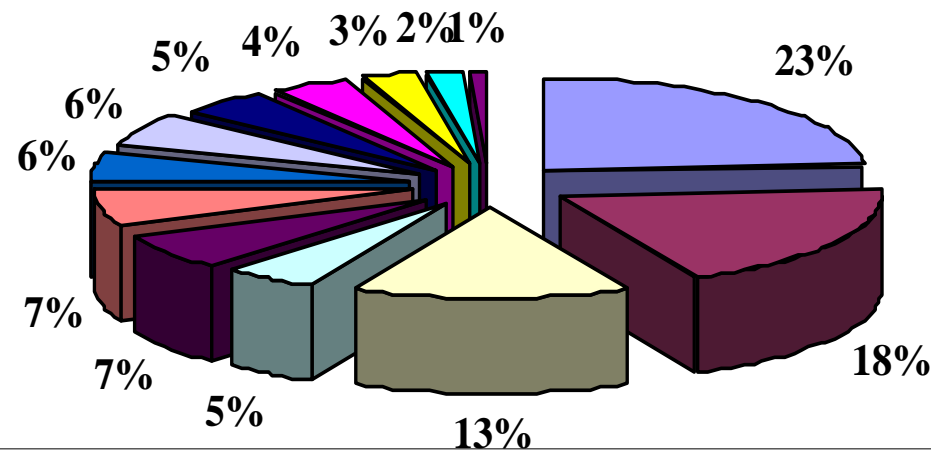


- Out of the 289 companies we phoned, 117 companies have set up R&D facilities in China;
- 215 R&D centers were set up by them;
 - 107 are autonomous R&D labs;
 - 59 are R&D units in the local subsidiaries;
 - 49 joint centers (with universities and so on)

General findings: industrial distribution



Figure 1 The industrial distribution of autonomous R&D labs settled by Business Week 1000 MNCs in China (2004)

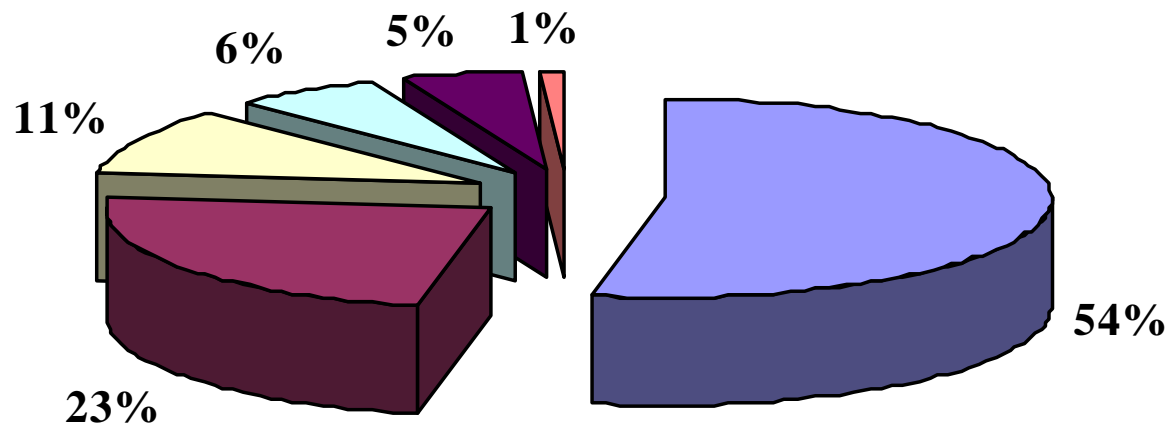


- | | |
|---------------------|--------------------------------------|
| Software | Telecommunications |
| Semiconductors | Industrial Equipments and components |
| Automobiles | Commodity Chemicals |
| Biotechnology&Drugs | Household Electronics |
| Other IT Products | Chemicals |
| Food and beverages | Industrial Conglomerates |
| Others | |

General findings-country distribution



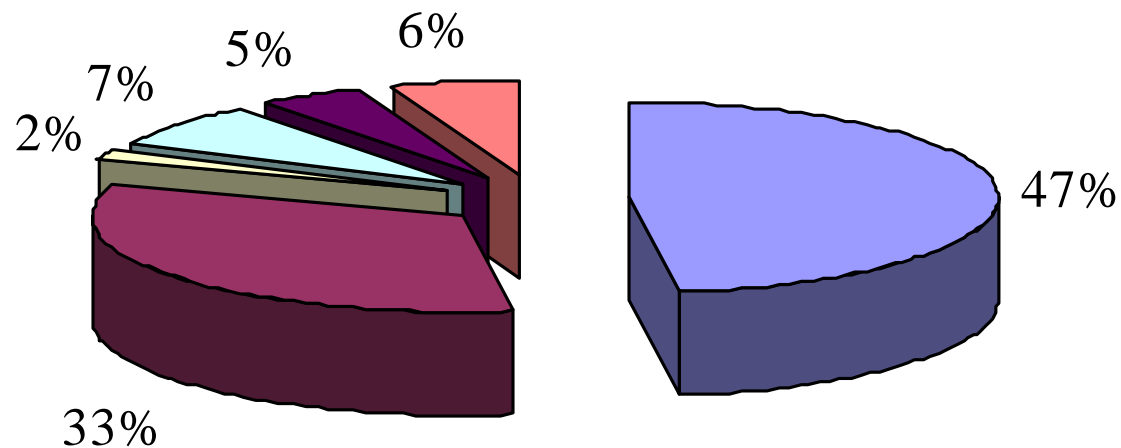
Figure 2 The country distribution of autonomous R&D labs settled by Business Week 1000 MNCs in China (2004)



General findings-location choice



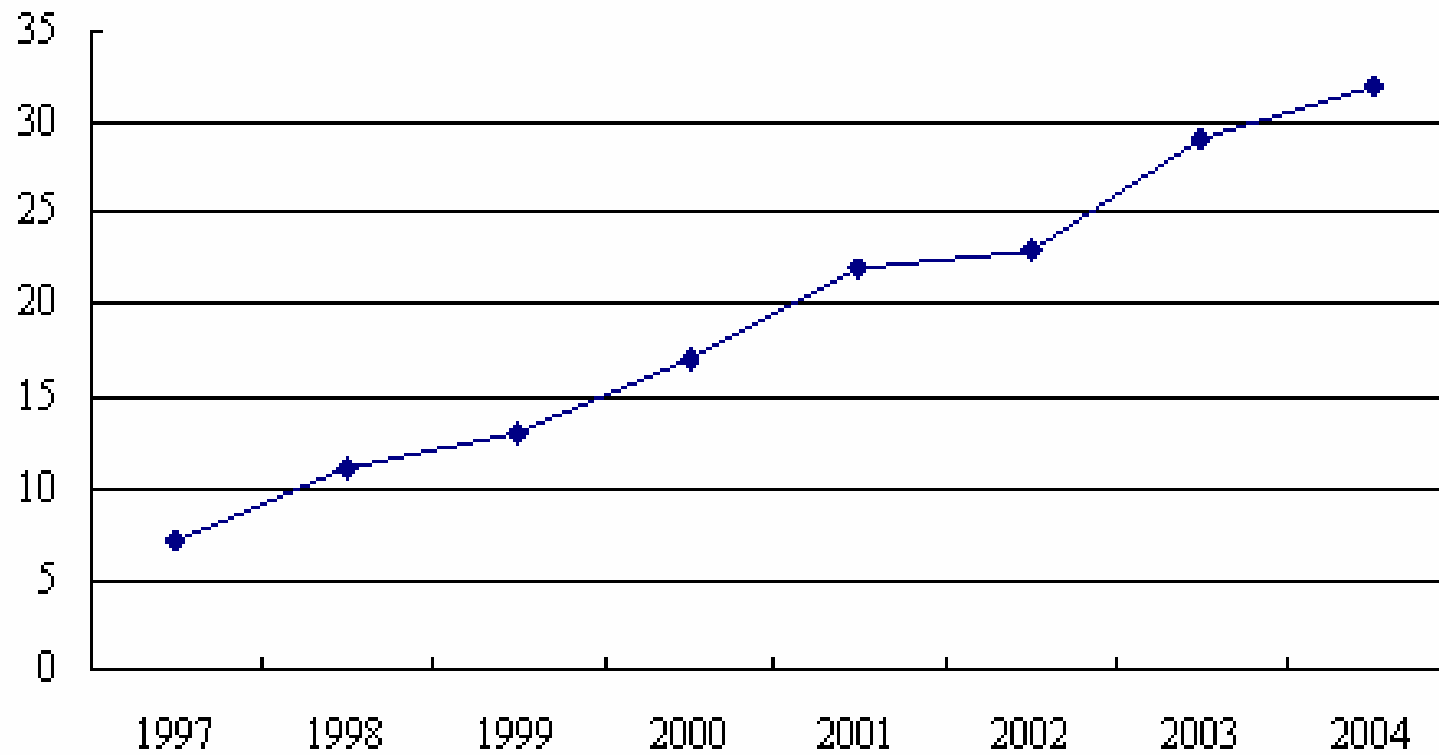
Figure 3 The regional distribution of autonomous R&D labs settled by BusinessWeek 1000 MNCs in China (2004)



Special case-Beijing



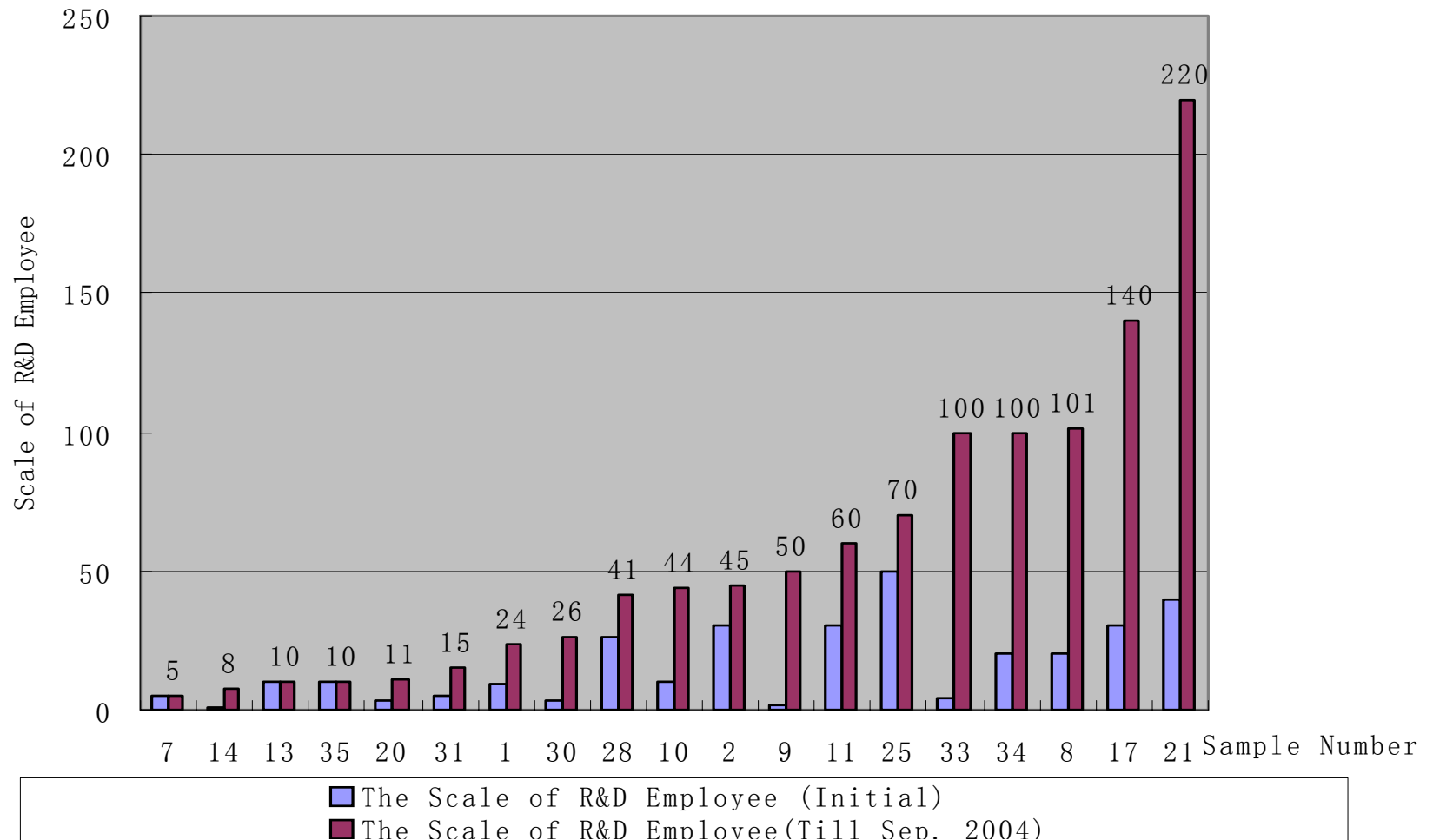
- The growth of MNC in Beijing



comparison of the initial scale and current scale of R&D employees



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Positioning of the R&D Centers



Figure 5 The positioning of MNCs' R&D centers in Beijing

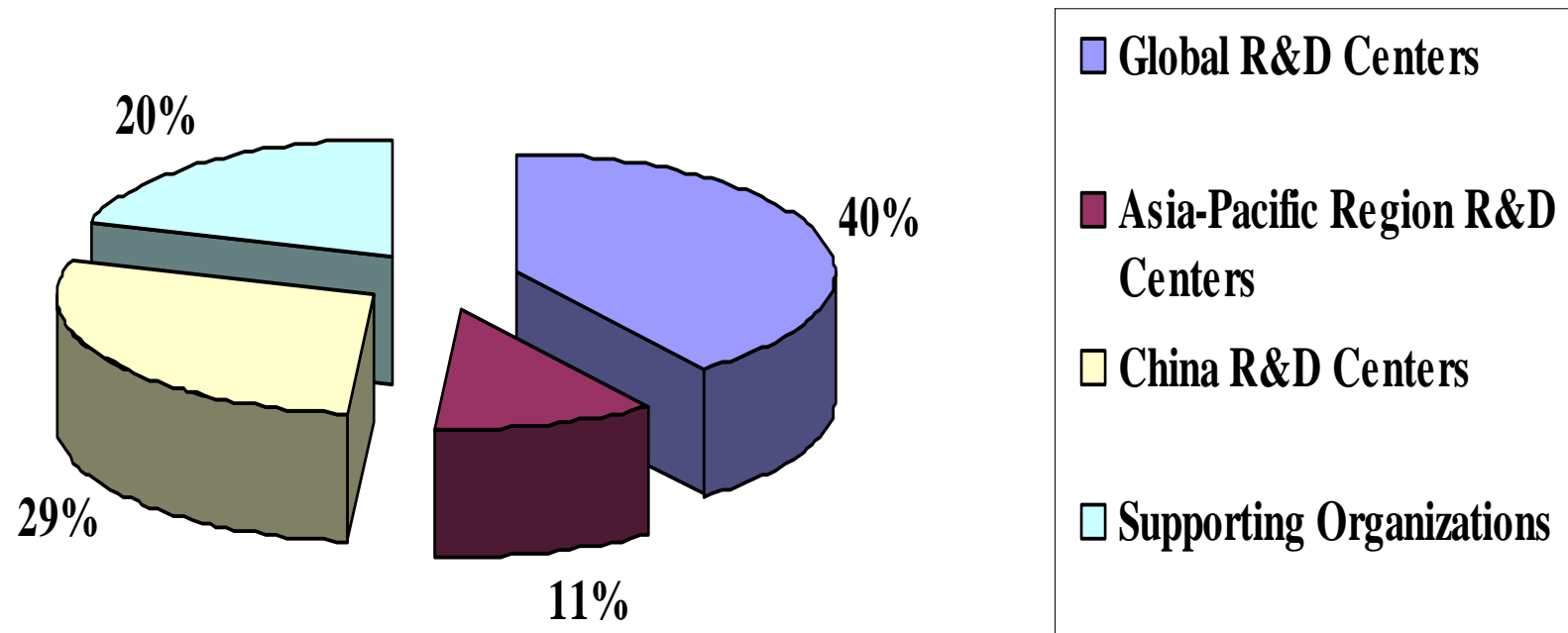
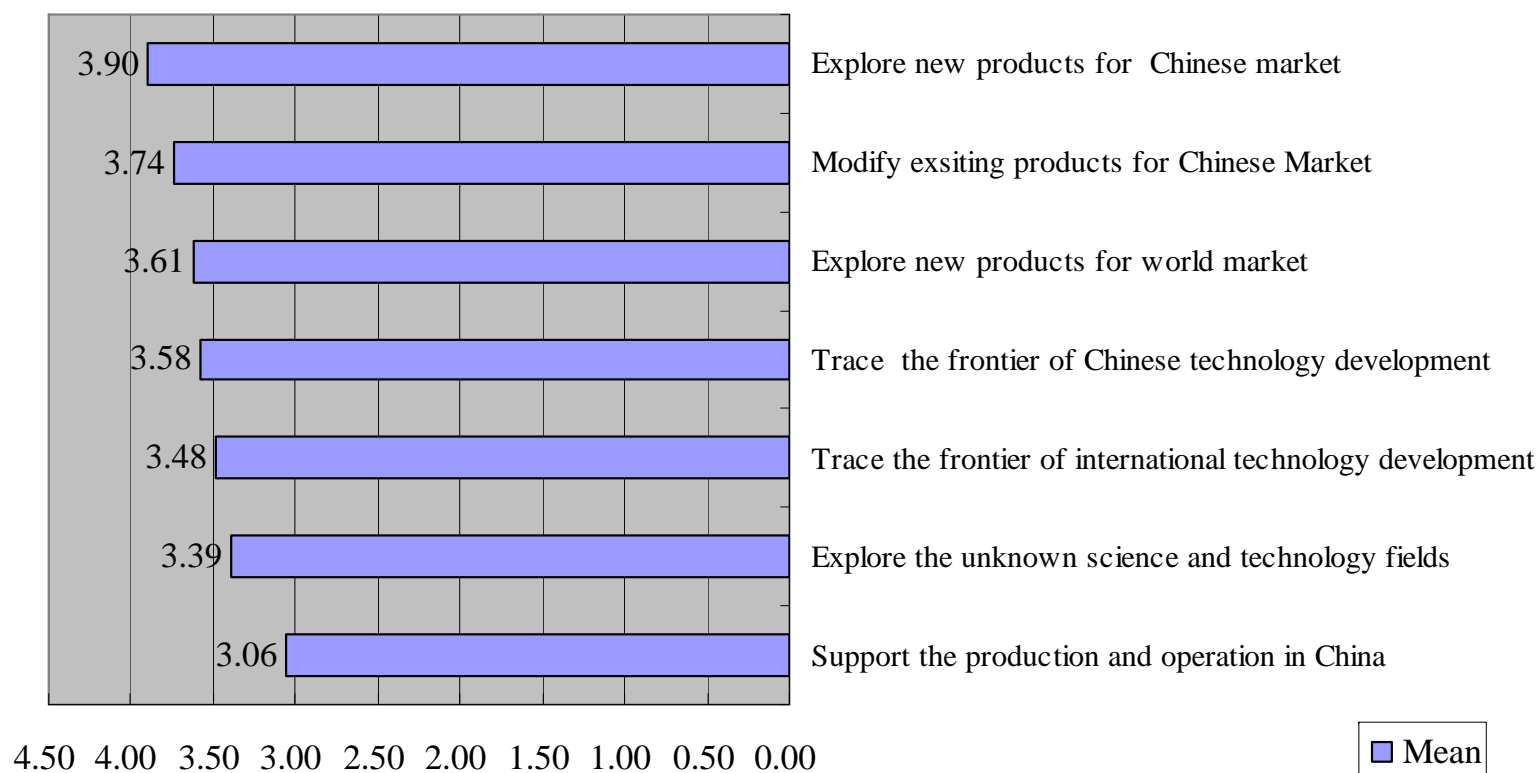


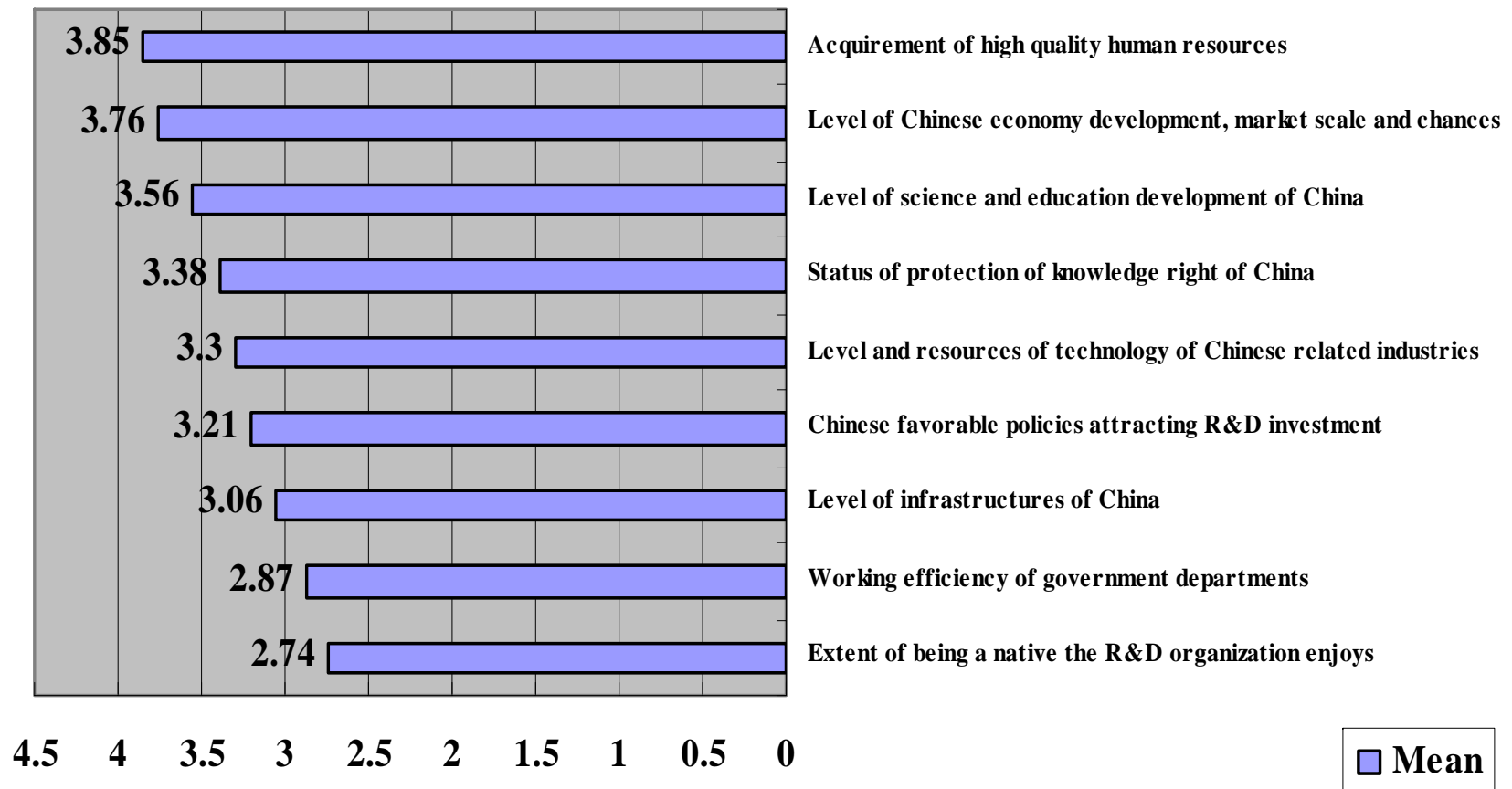
Figure 4 The importance of different objectives of the R&D centers' work(2004)



What attracts these R&D centers to Beijing?



Figure 6 The importance of different factors which have impacts on MNCs' R&D investing decision in China



Importance of sources of knowledge of MNCs' R&D Centers in Beijing



Sources	Number of Samples	Mean
R&D Headquarter	30	3.7667
Literature	30	2.1667
Brother R&D Centers	30	2.1667
Chinese Uni. Or Inst.	30	1.9333
Colleague R&D Centers	30	1.2000
Local Brother Factories	30	1.1667

Figure 7 The frequency of communications between MNCs' R&D centers and Chinese university/science research institute (the number of correspondent R&D centers)

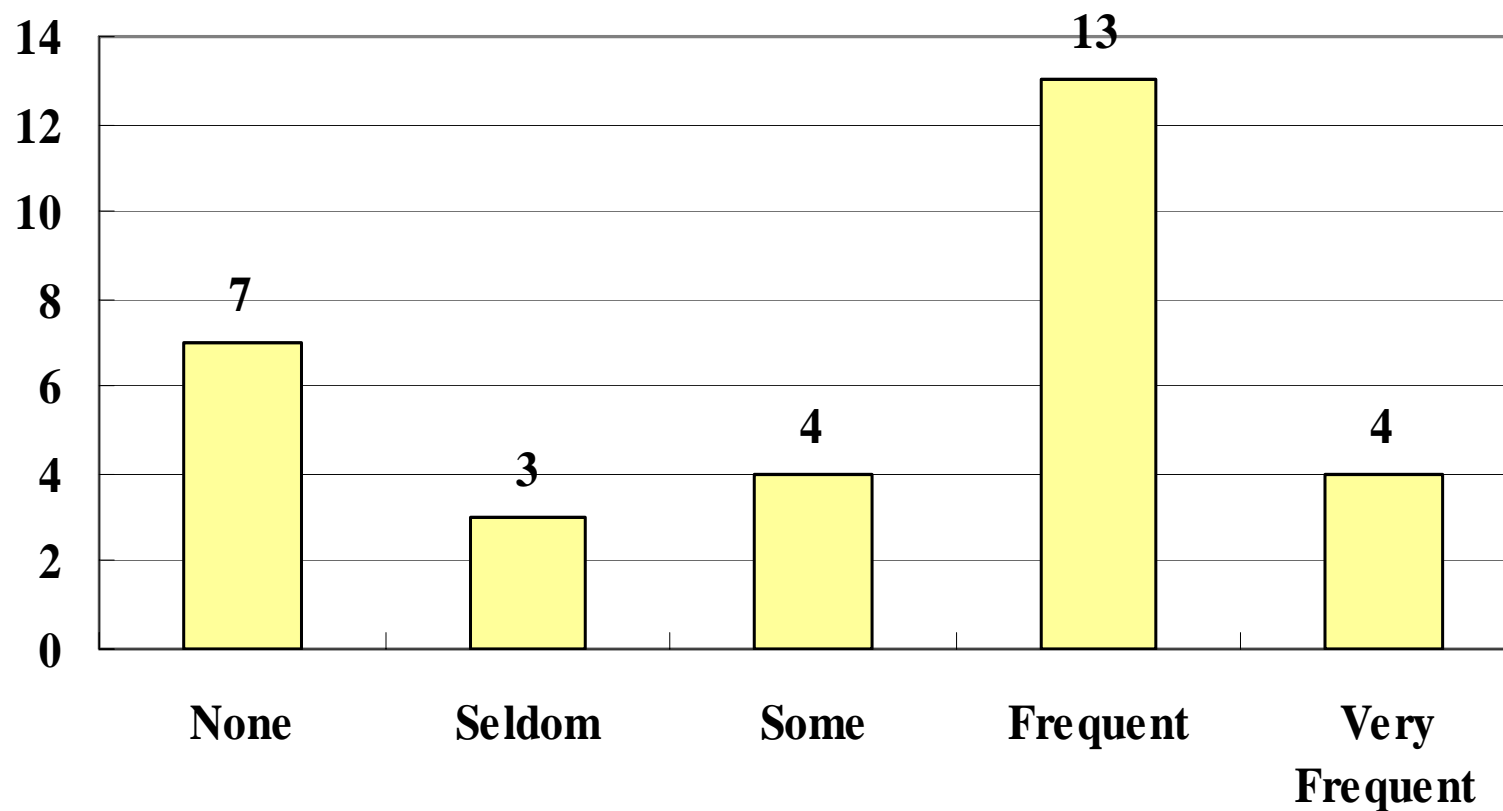
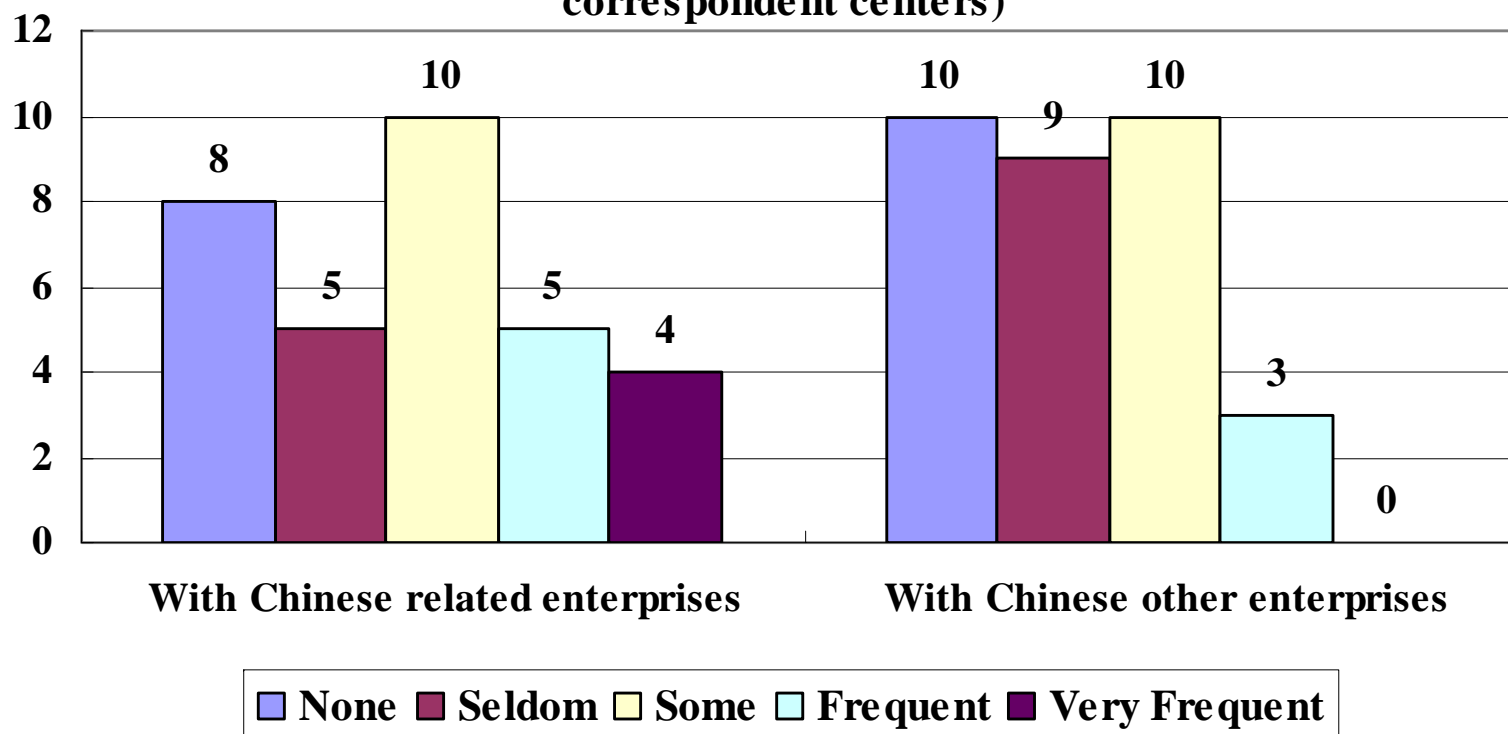


Figure 8 The frequency of communications between MNCs' R&D centers and Chinese enterprises (the number of correspondent centers)



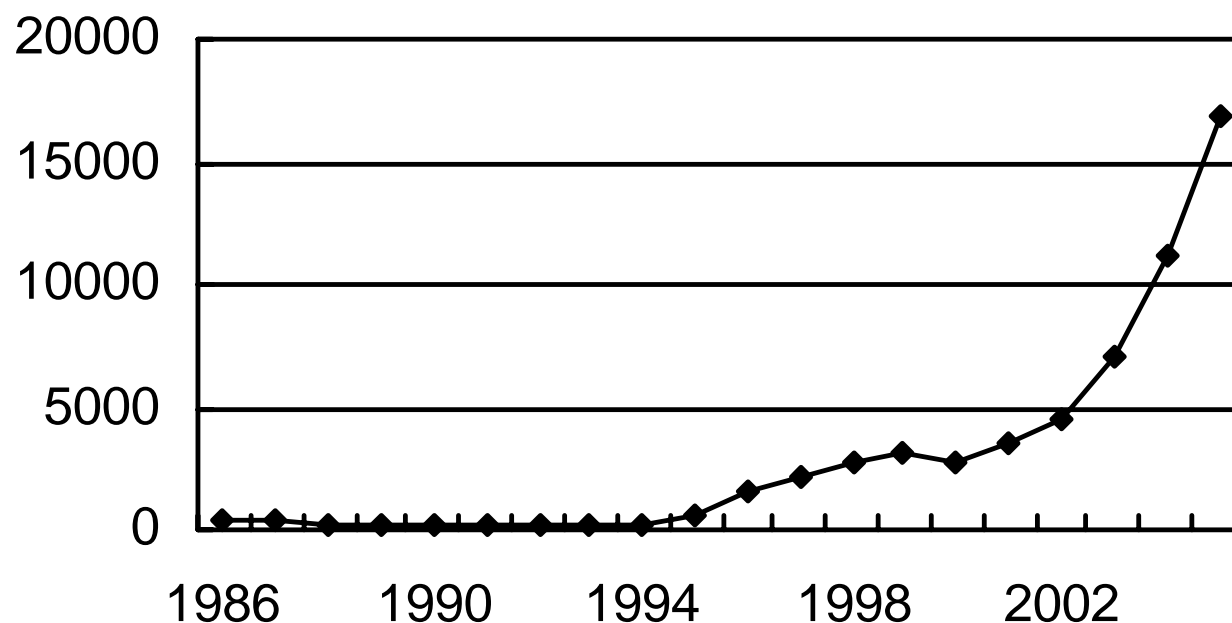
Special case-patenting activity



- Patent applications have been growing very fast by the sample MNCs in China:
 - 16934 inventions were granted in 2005, nearly 50 times as many as in 1986, which were only 341.
 - Inventions among foreign patents claim a share as high as 91.78%. which is very different from domestic patenting structure.



Special case-patenting activity



Overall Invention granted in China(1986-2005) of 36 MNCs

Patent applications have been growing very fast by the sample MNCs in China, particularly after 2001.

long time lags of the patents filed in China



Most of the patents filed in China did not originate from China. There is a relatively long time lag between when it is first granted overseas and when it is granted in China:

- Time lag is 27.95 months on average;
- Most prior-granted inventions have time lags of one, two, or three years, respectively of 23.75%, 41.20%, and 23.92%.
- Granting lag varies between different industries, notably, biotechnology and pharmaceuticals are long.

Very few patents originate from R&D centers



- only 924 patents granted to these MNCs were filed initially in China, accounting for 0.75% of the overall invention patents filed in China by them;
- Why so few patents are filed by these R&D organizations in China?
 - Some of MNC centers are part of the value chain of R&D activities. The integrator is the corporate R&D center at the home country;
 - Some of the MNC centers in China file their results in their parent countries as the result of these companies' overall IPR strategies.

Special case-universities



■ Focus:

- MNC's joint R&D centers, labs, or technical centers with Chinese universities (211 universities);

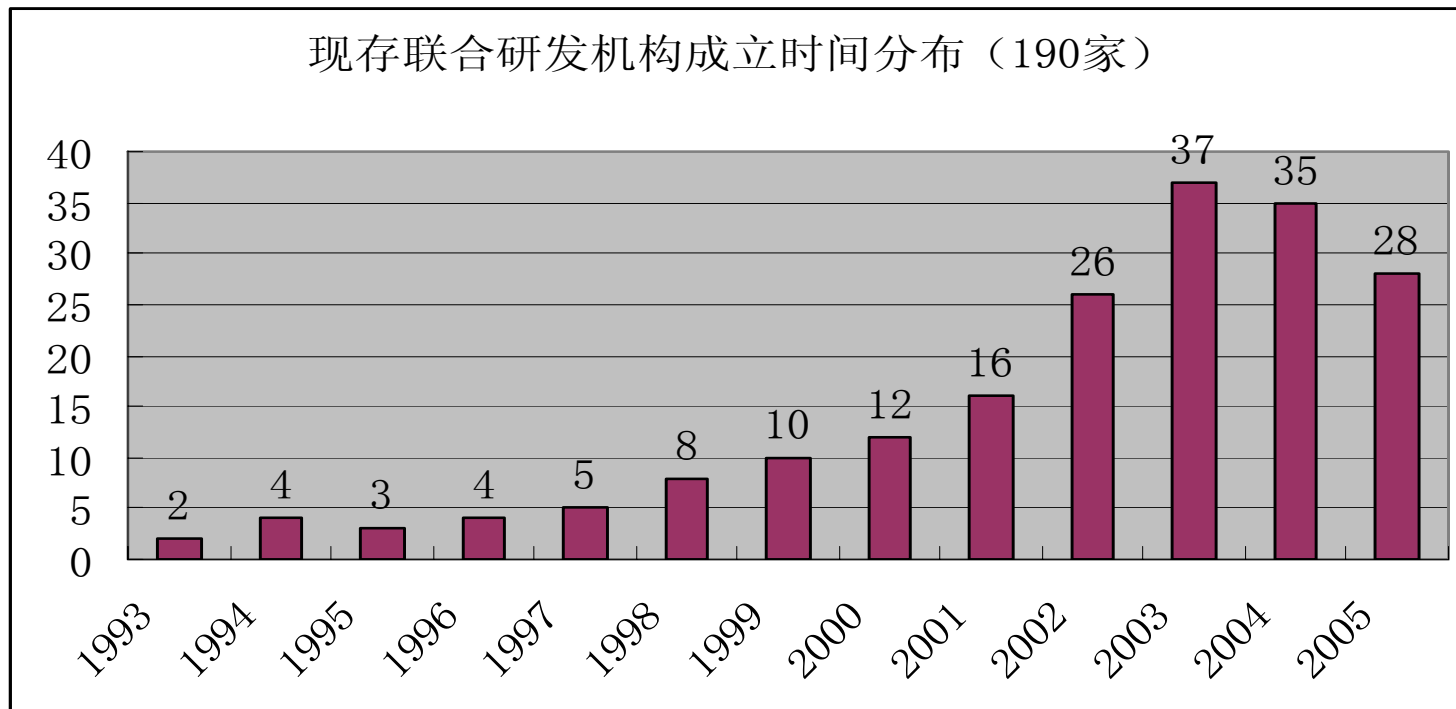
■ Data

- Phone interview and media collection
- Questionnaires to universities
- Interviews with directors of the centers



Overall status

By the end of 2005, 97 MNCs from 14 countries have established 202 joint research facilities, 190 were in operation.

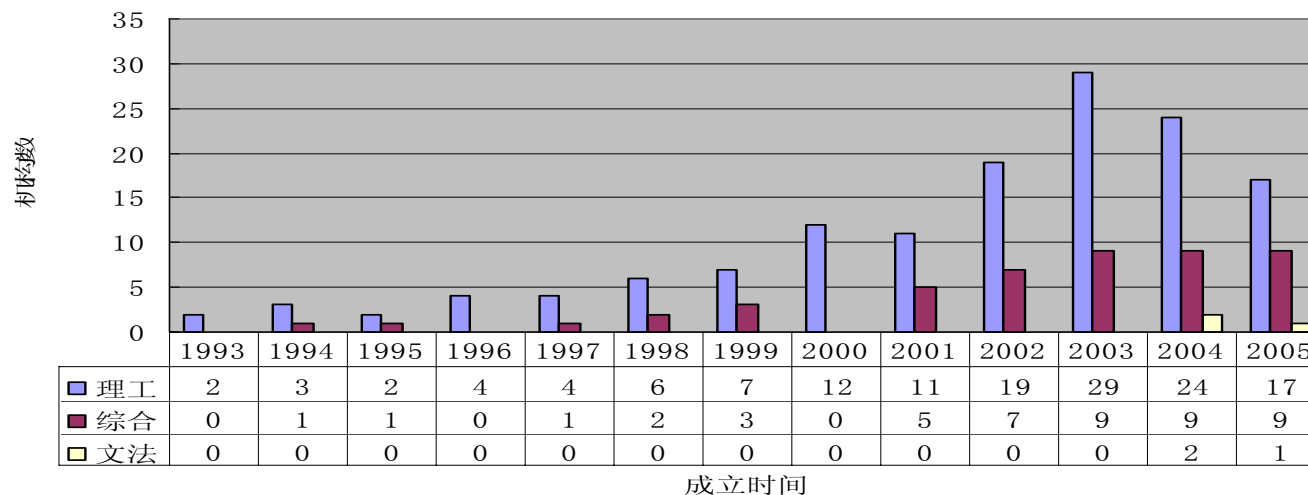




Type of Universities MNC collaborated

Universities	Compre.	Polytechnical	H&SS
# of Univer.	10	24	2
% of univr.	28%	66%	6%
# of centers	48	140	3

不同类别高校联合研发机构成立时间分布



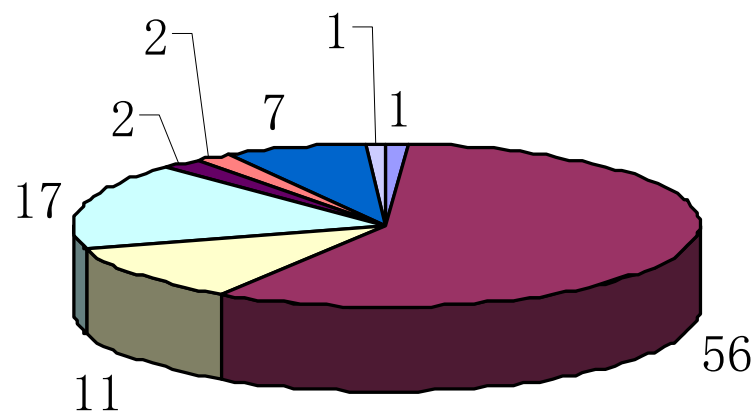
Universities MNC collaborated-by ranking











<u>Ranking of uni.</u>	<u>1-5</u>	<u>6-10</u>	<u>11-30</u>	<u>30-100</u>	<u>>100</u>
Number of uni.	5	5	12	12	2
As % of uni. In the category	100%	100%	60%	17%	N/A
# of institutions	76	30	49	33	2
As % of total inst.	40%	16%	26%	17%	1%

Joint research facilities-by industry

跨国公司按产业分 (97家)

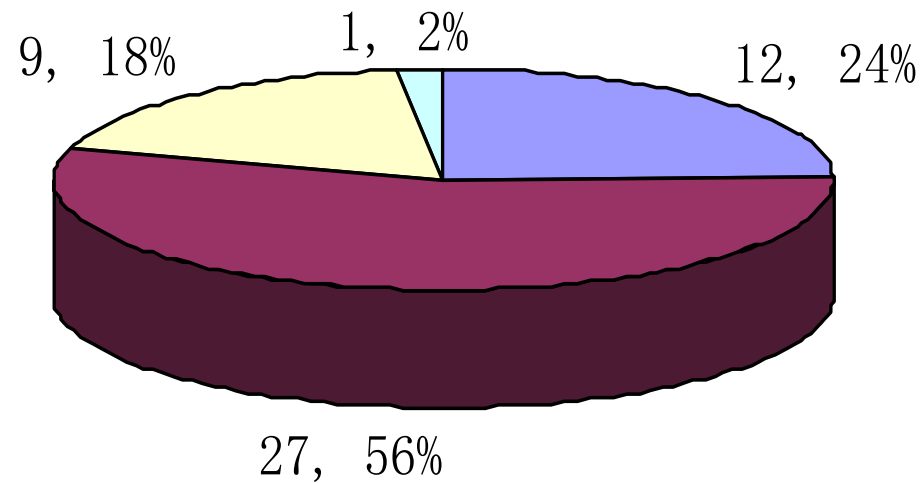


- | | | |
|--|---|--|
|  材料 |  电子信息 |  工业集团 |
|  工业设备 |  化工 |  交通工具 |
|  其他 |  医药、生物技术 | |

Source of basic funding



51个样本机构经费来源分布



- A主要由中方筹集或出资
- B主要由外方筹集或出资
- C由双方按比例承担
- D来自第三方委托



Scale of joint research facilities-# of employees

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Scale	<10	10—20	20—50	>50
# of instit.	12	14	16	3
%	26.67%	31.11%	35.56%	6.67%

Discussion



- While the number of MNC R&D centers has been increasing quickly, a high percentage of these R&D centers are still at the initial stage of their development process;
 - In the next few years, the growth in numbers may slow down, but the scale may go up;
- High quality S&T human resources and market opportunities are the most important factors drawing MNC R&D centers to China;
 - Local market orientation
 - Human resource orientation-for the global R&D activities



- Many of these centers behave more like enclaves in China, interacting mostly within the company's own network; the linkages with local companies are very weak.
 - Part of the global R&D process?
- Information assessing research output of these R&D centers are limited. But the available information suggests that their outputs in China are “limited .”
 - integrated at the headquarter?
 - IPR protection?

Thank you!



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