

Fostering University Industry Relations

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Outline of Lecture

- What is “Open Innovation”? And why is it relevant to technology transfer (from university) management?
- Survey of open innovation trends: a case of Japan (RIETI Survey on R&D collaboration)
- Understanding firm’s motivation for R&D collaboration
- Technology management strategy in open innovation era: industry variation

Open Innovation

“Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology” (Henry Chesbrough, UC Berkley)

Related Concept

- R&D collaboration, Joint venture, Licensing
- Technology market (via intellectual property right)
- Technology sourcing (via open market)

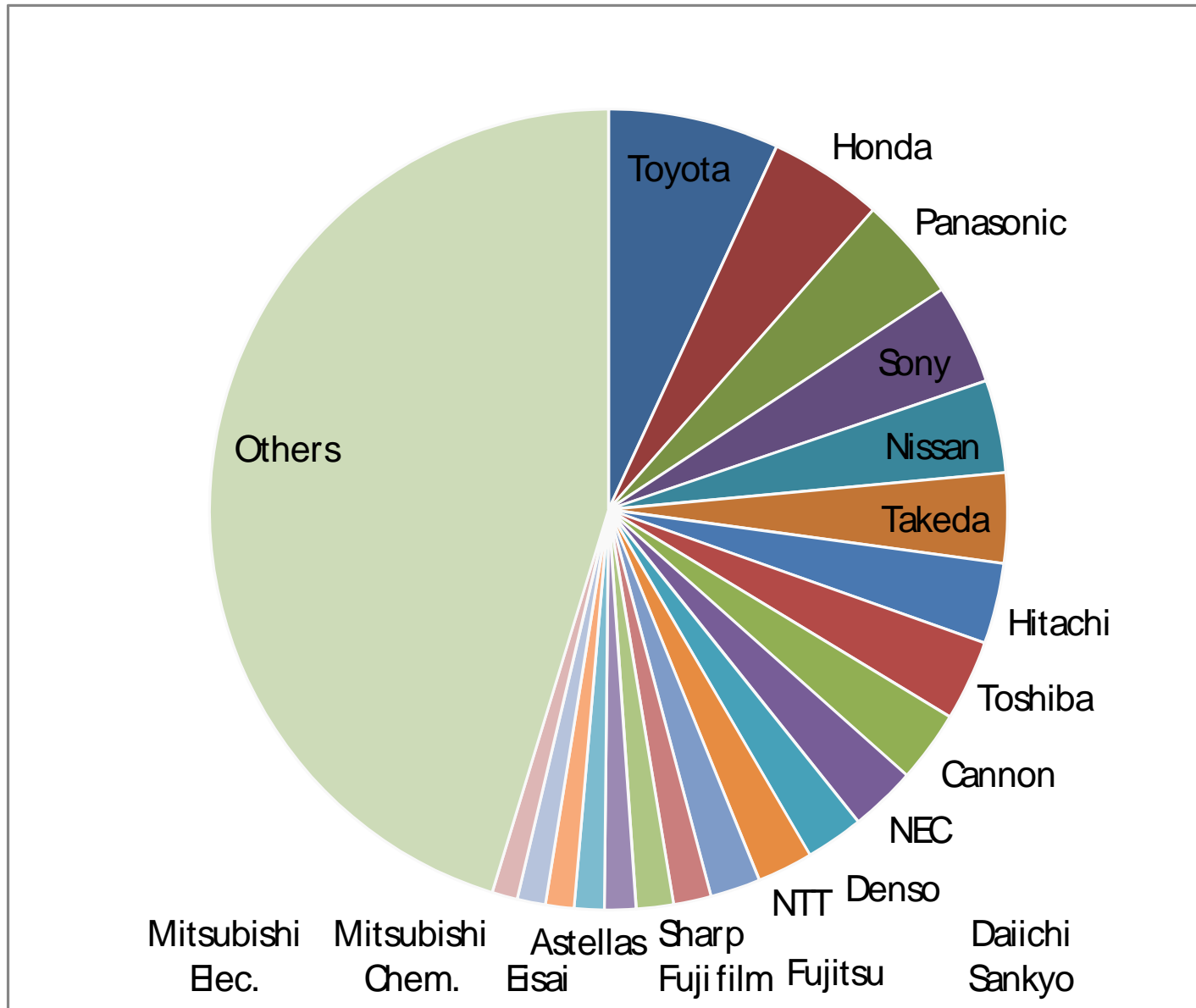
What drives the trend from internal R&D to open innovation?

- Globalization and intense innovation competition: Catching up and growing importance of emerging economies (such as BRICs)
- Necessity of innovation speed in order to appropriate rents from R&D
- Importance of scientific knowledge for industrial innovation: particularly the case for bio-pharmaceuticals
- Institutional changes in science sector: PRIs and national university reforms (such as US in 1980's, Europe and Japan in 1990's)

Implications for Technology Licensing Management in University

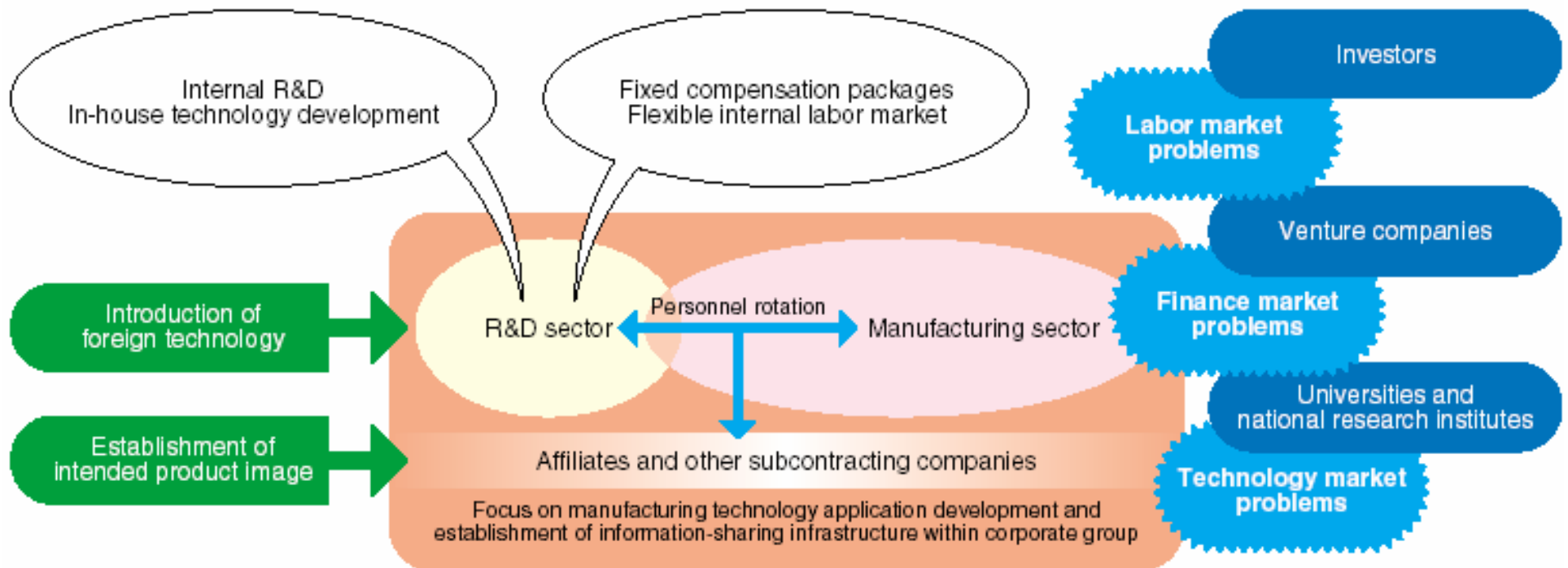
- Very welcome!
- But it is important to understand the firm's incentives for acquiring external technology (management of “boundary of firm”)
 - Changing firm's needs for university technology
 - Technology management strategy depends on to what extent your counterpart well manages open innovation
 - The style of open innovation movement is quite heterogeneous and substantially different across technology fields

High concentration of R&D activities



Japan's national innovation system

Compartment system by large company: Japan

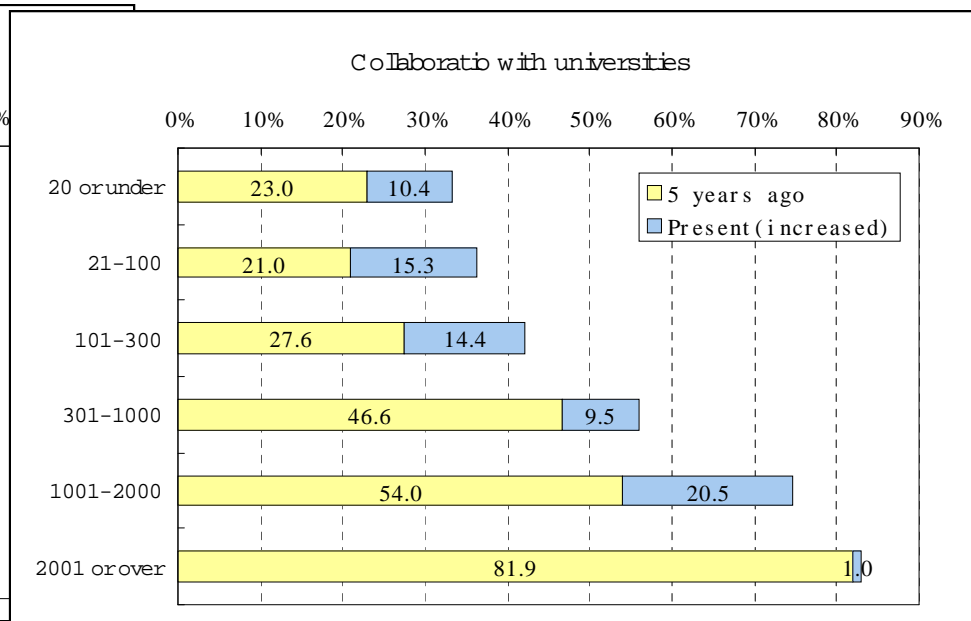
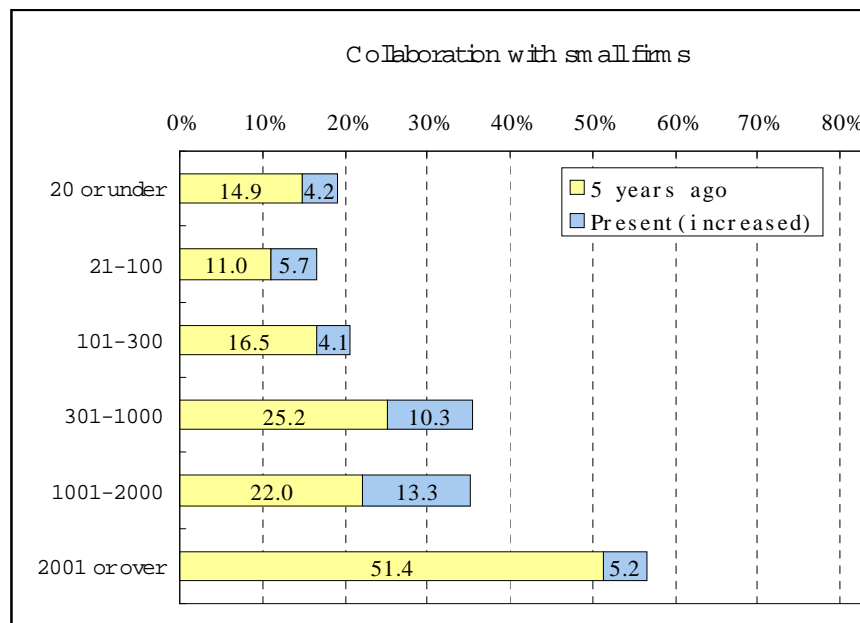
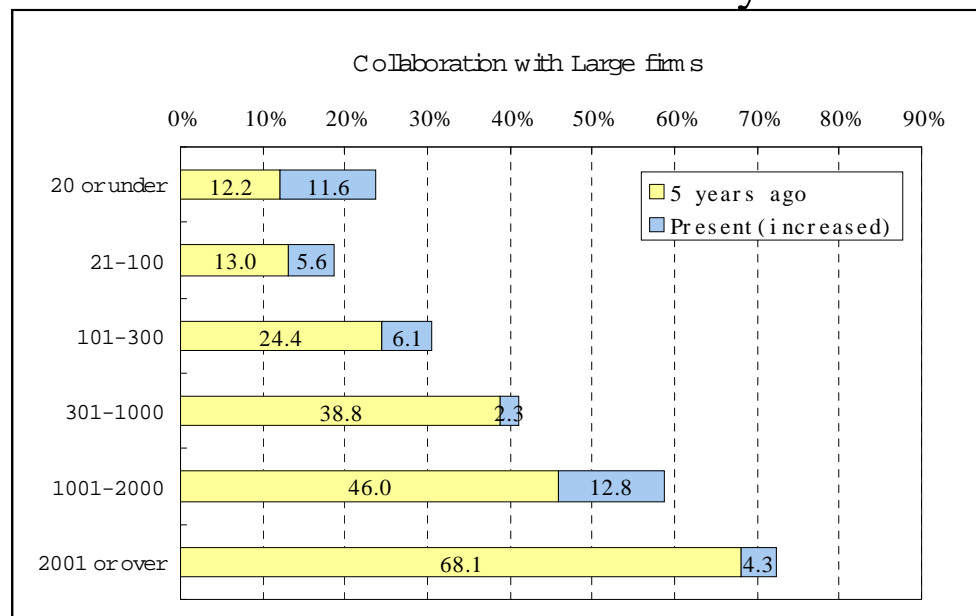


RIETI's Survey on R&D Collaboration

- Firm level survey on external R&D collaboration: business to business networks and university and industry linkages
- Data for 2003, 556 samples
- Survey items
 - Recent trend of external R&D collaboration and IPR licensing
 - Factors behind R&D collaboration decision
 - Managing the boundary of firm in R&D, internal R&D vs outsourcing
- Detail results are found as the following site
<http://www.rieti.go.jp/jp/projects/innovation-system/H15.html>

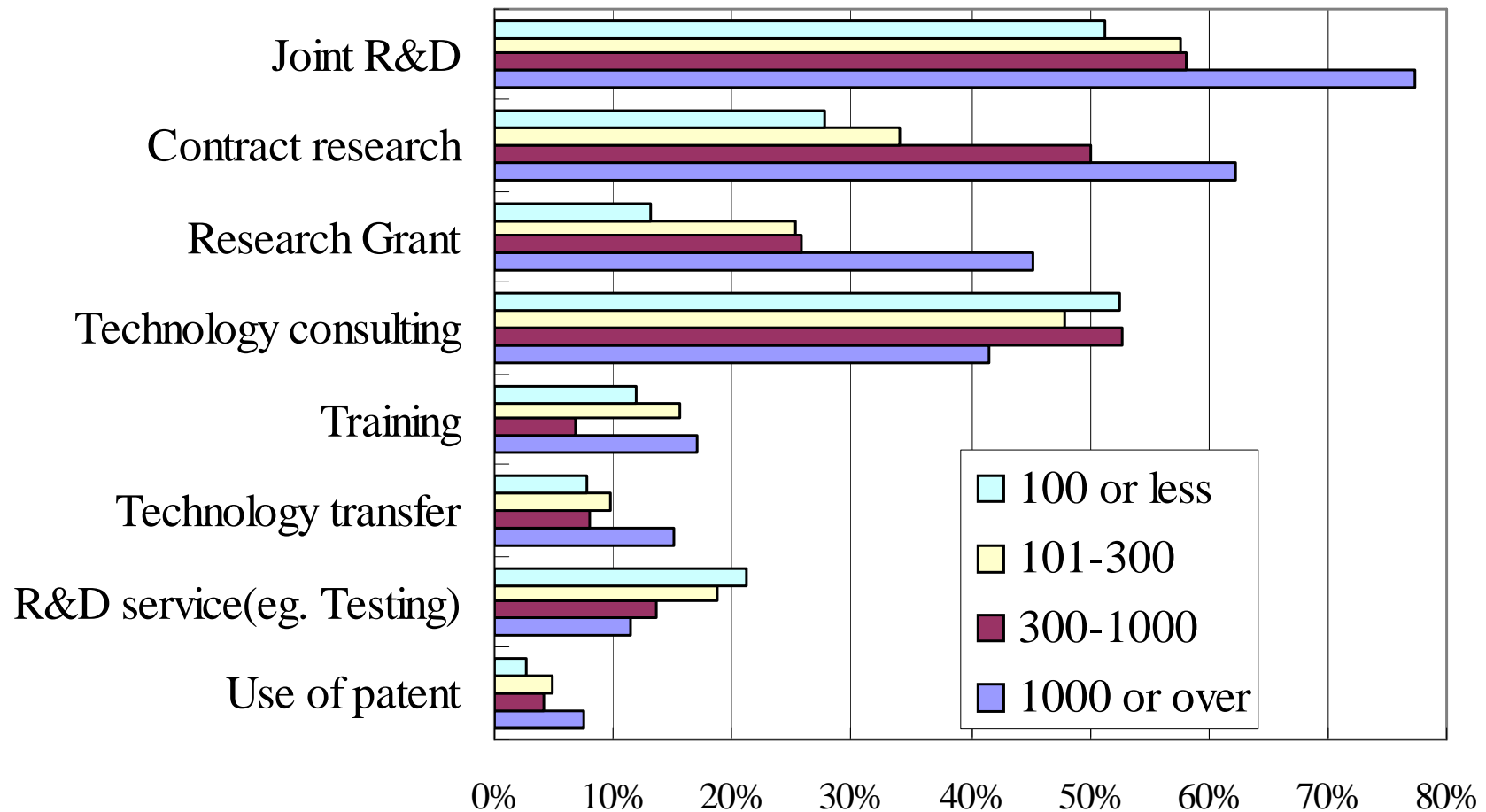
Japanese system is changing?

From RIETI survey

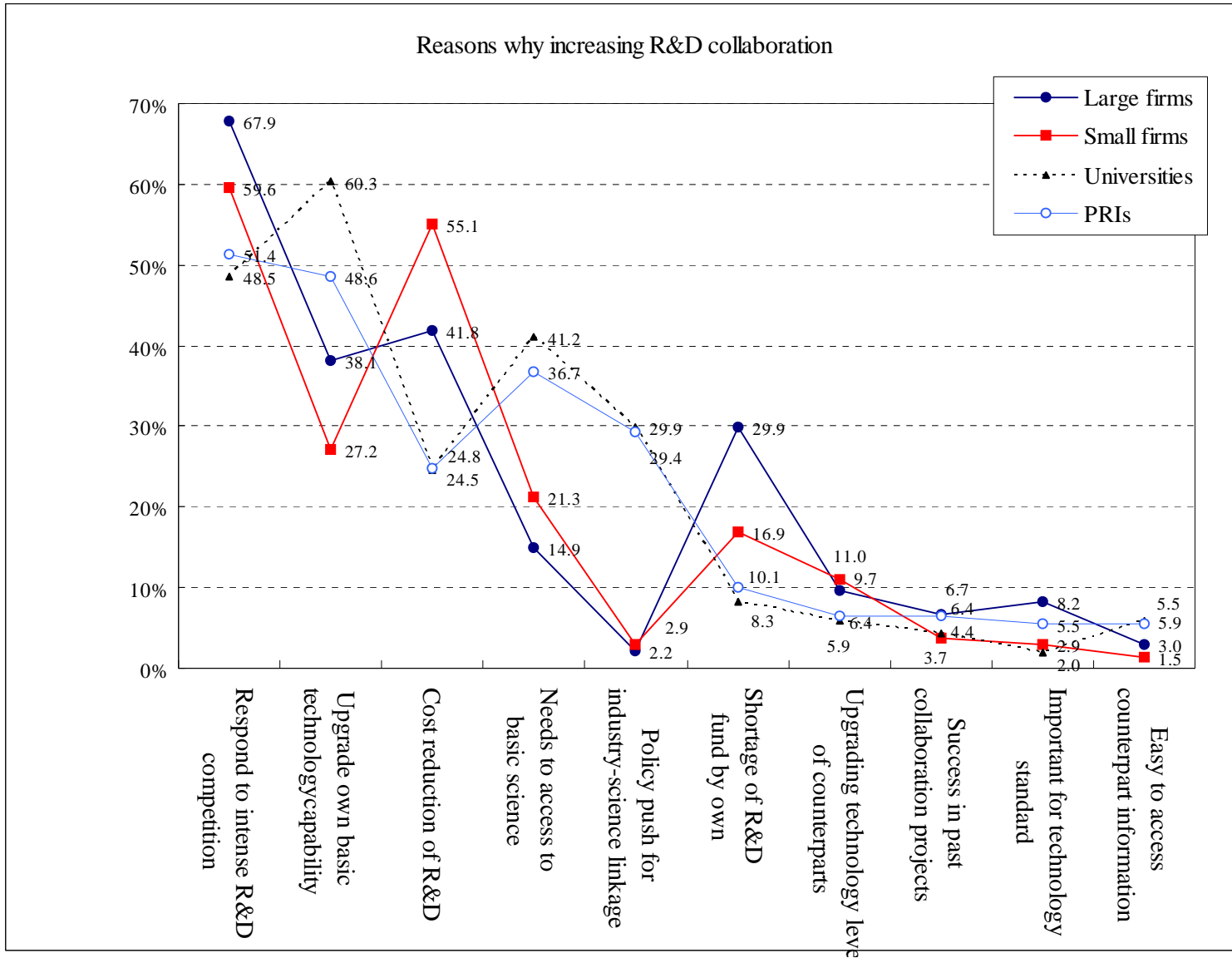


Understanding UIC activities

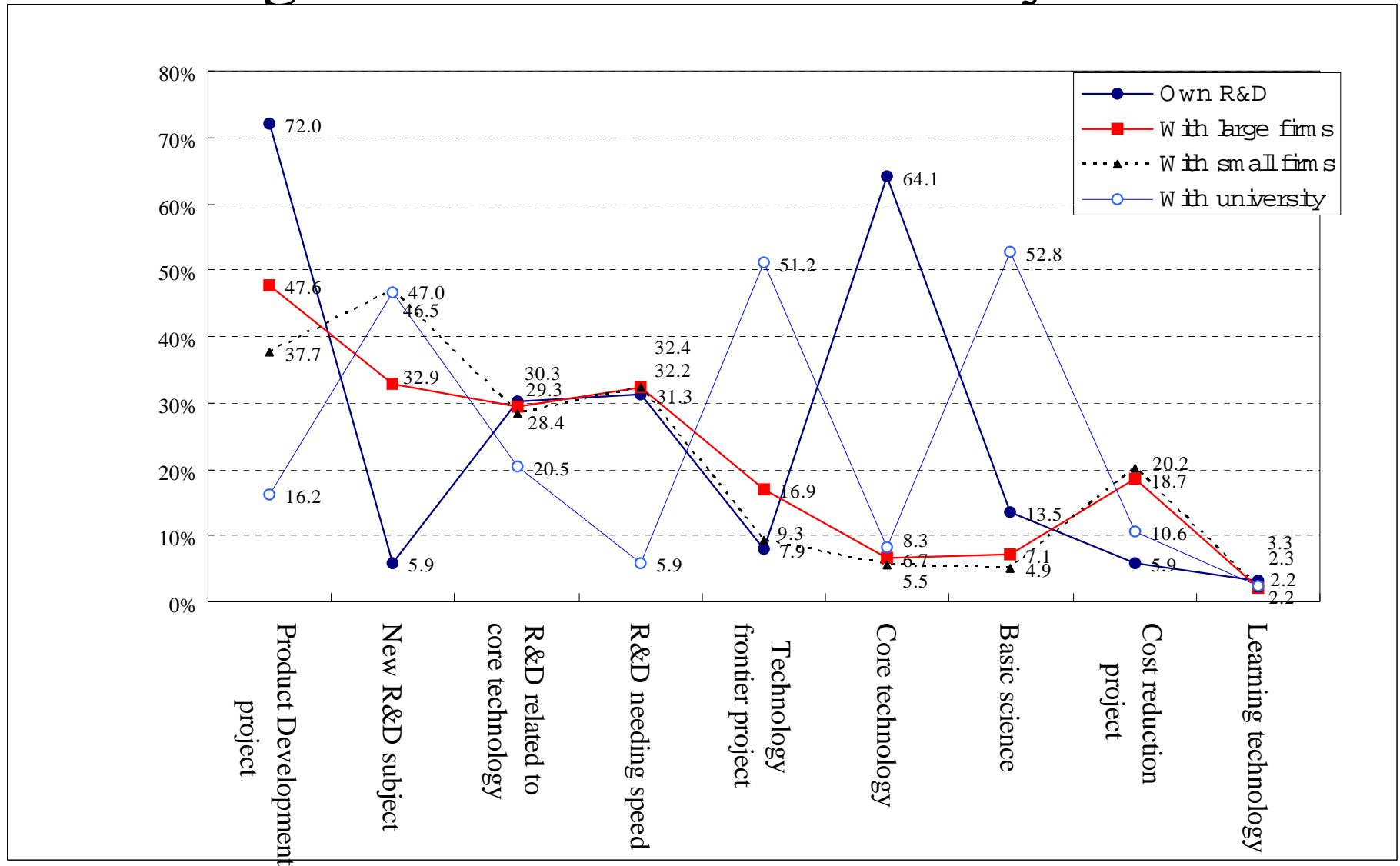
Fig. 2 Style of collaboration with university



Factors behind R&D outsourcing



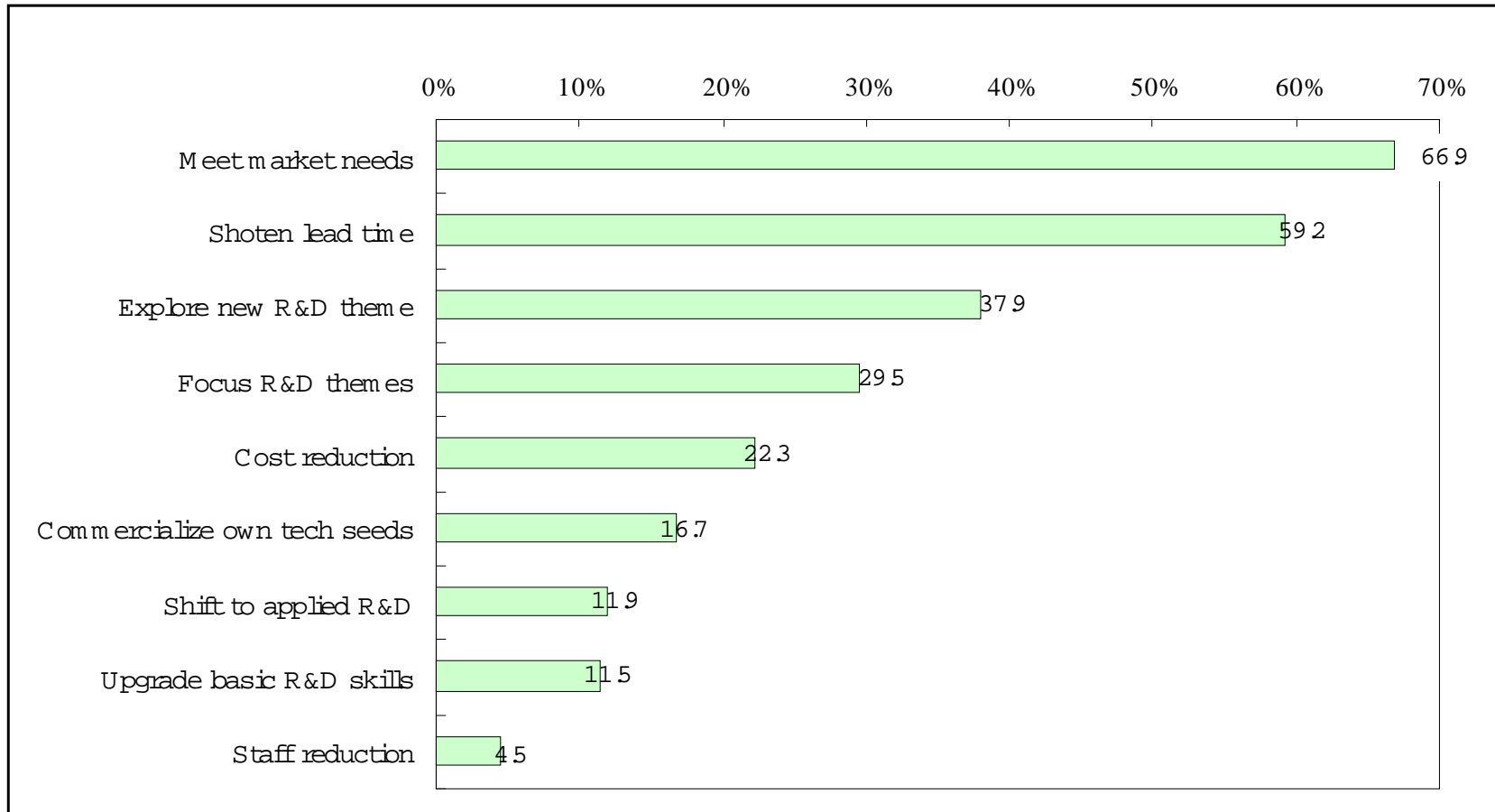
Management of firm's boundary in R&D



Motivation and underlining hypotheses for econometric analysis

- Factors behind external R&D collaboration
 - Intense innovation competition?
 - Increasing complexity of innovation and the role of scientific knowledge
 - Selection and concentration of R&D projects, but it needs wider technological scope
- UIC's impacts on research and production productivity: greater impact for small firms
 - Less Not-Invented-Here Syndrome
 - Focusing on more concrete project (short term benefit) and greater pressure for commercialization

Business Environment Change Related to R&D Strategy

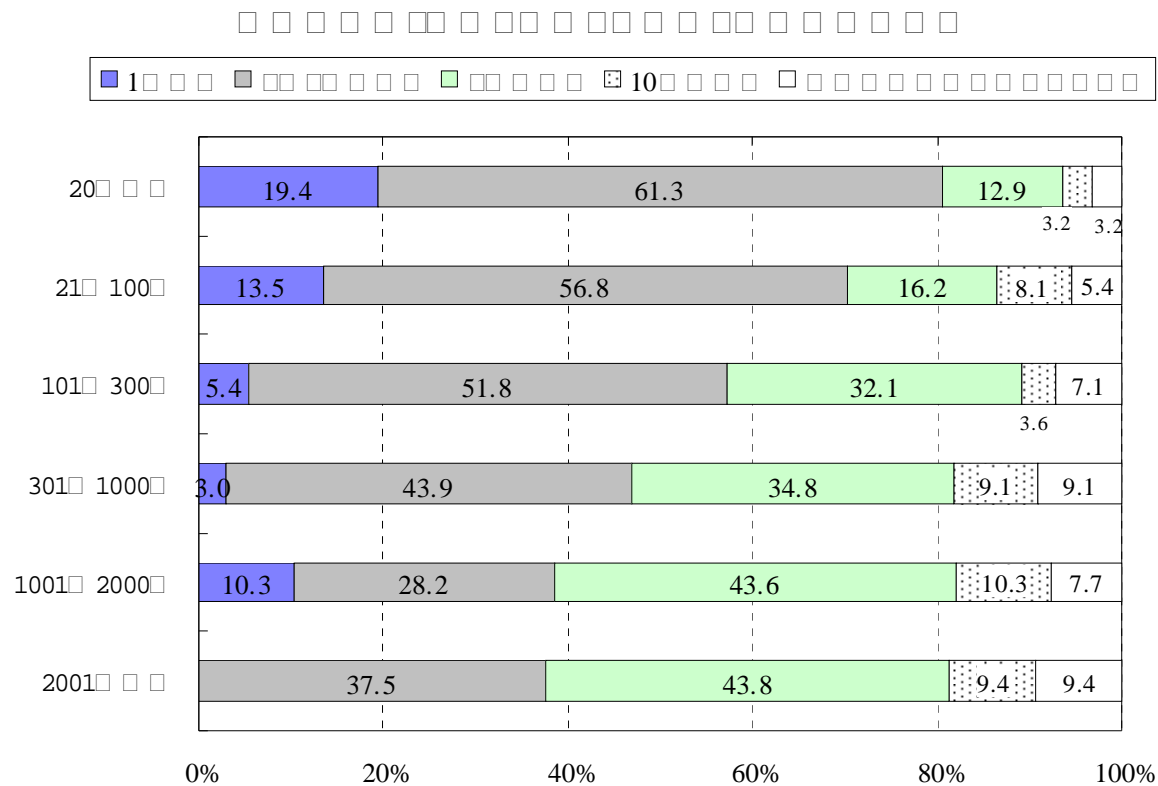


Collaboration and R&D strategy

	Large firms		SME and startups		Universities	
	SME	LF	SME	LF	SME	LF
Shorter development lead time		++				++
Focusing R&D theme				--		++
Reduce R&D cost					+	
Reduce R&D staffs						
Explore new technology seeds	+++					++
more R&D for application and development project					++	++
Improving basic technology capability			--			
Market needs for R&D						
Commercialization of tech seeds	++				++	+

UIC contents by firm size

Smaller firms collaborate with universities for development stage project, while larger firms prefer more fundamental oriented research projects



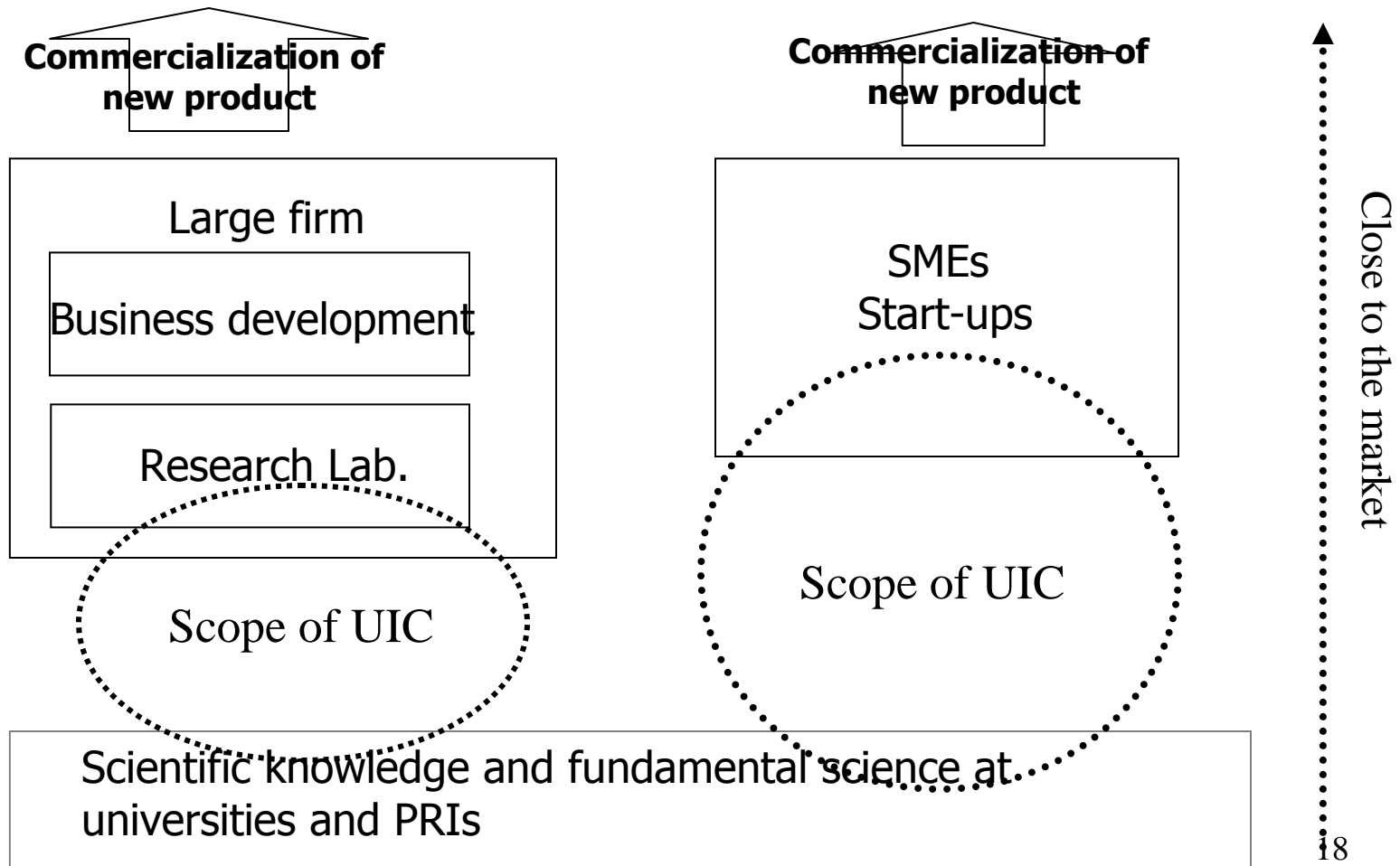
Research Productivity by Firm Age

	all	all	-1950	1951-70	1971-
	(1)	(2)	(4)	(5)	(6)
lrd	0.276 (7.81)**	0.260 (7.19)**	0.434 (5.61)**	0.183 (3.05)**	0.109 (2.29)*
lemp	0.250 (6.08)**	0.246 (5.41)**	0.397 (3.72)**	0.315 (3.30)**	0.131 (2.84)**
cord	-0.030 (0.23)	-0.056 (0.45)	-0.131 (0.53)	0.146 (0.67)	-0.169 (1.06)
univ1	0.377 (3.21)**	0.355 (3.05)**	0.203 (0.95)	-0.077 (0.33)	0.348 (2.09)*
lage		-2.402 (4.81)**			
lage2		0.360 (4.86)**			
Constant	-1.683 (7.10)**	2.302 (2.57)*	-4.257 (8.51)**	-1.188 (2.83)**	0.439 (1.30)
Industry Dummies	yes	yes	yes	yes	yes
Observations	450	438	168	134	136
R-squared	0.62	0.64	0.77	0.55	0.49

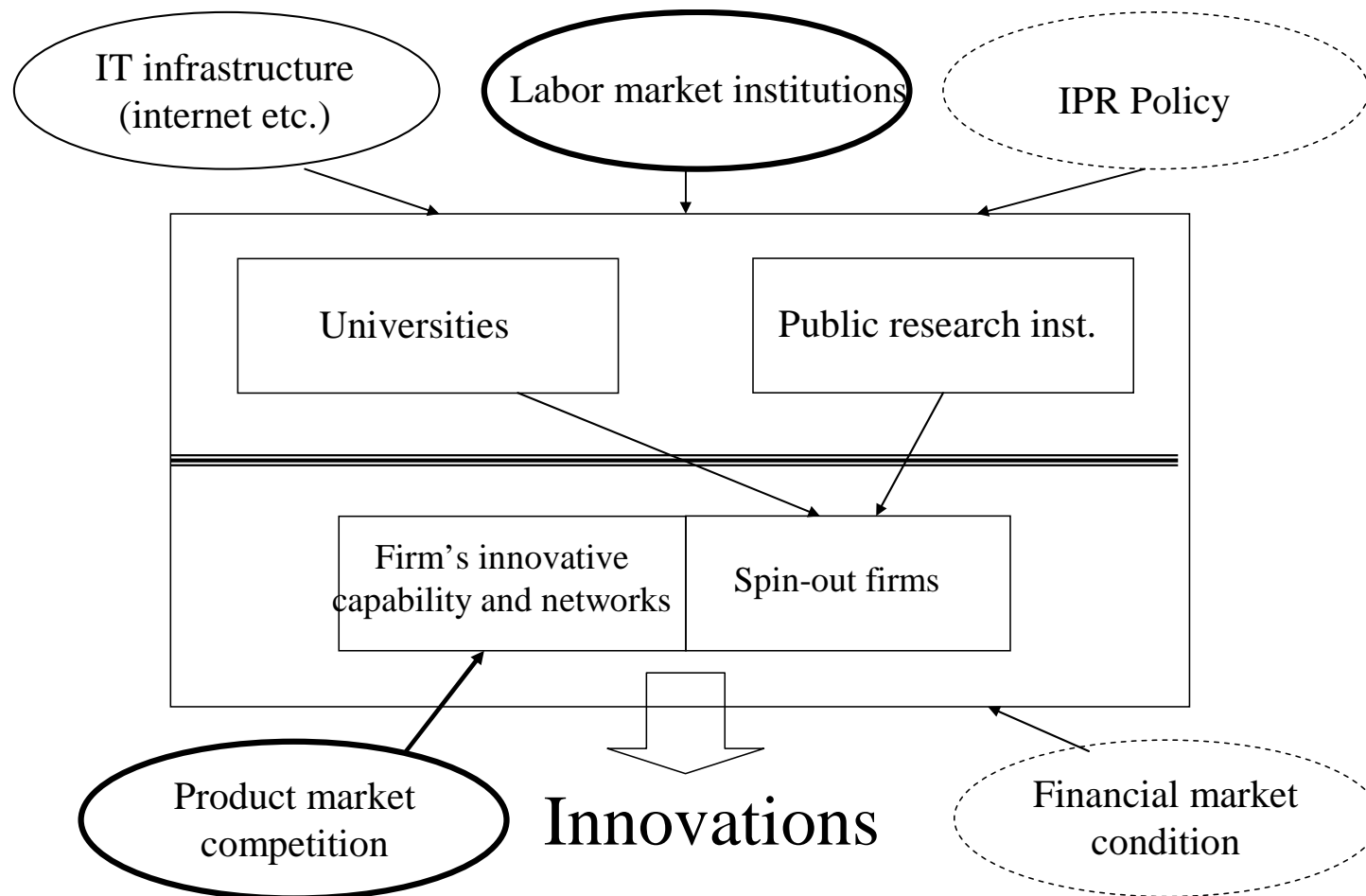
Absolute value of t statistics in parentheses

* significant at 5%; ** significant at 1%

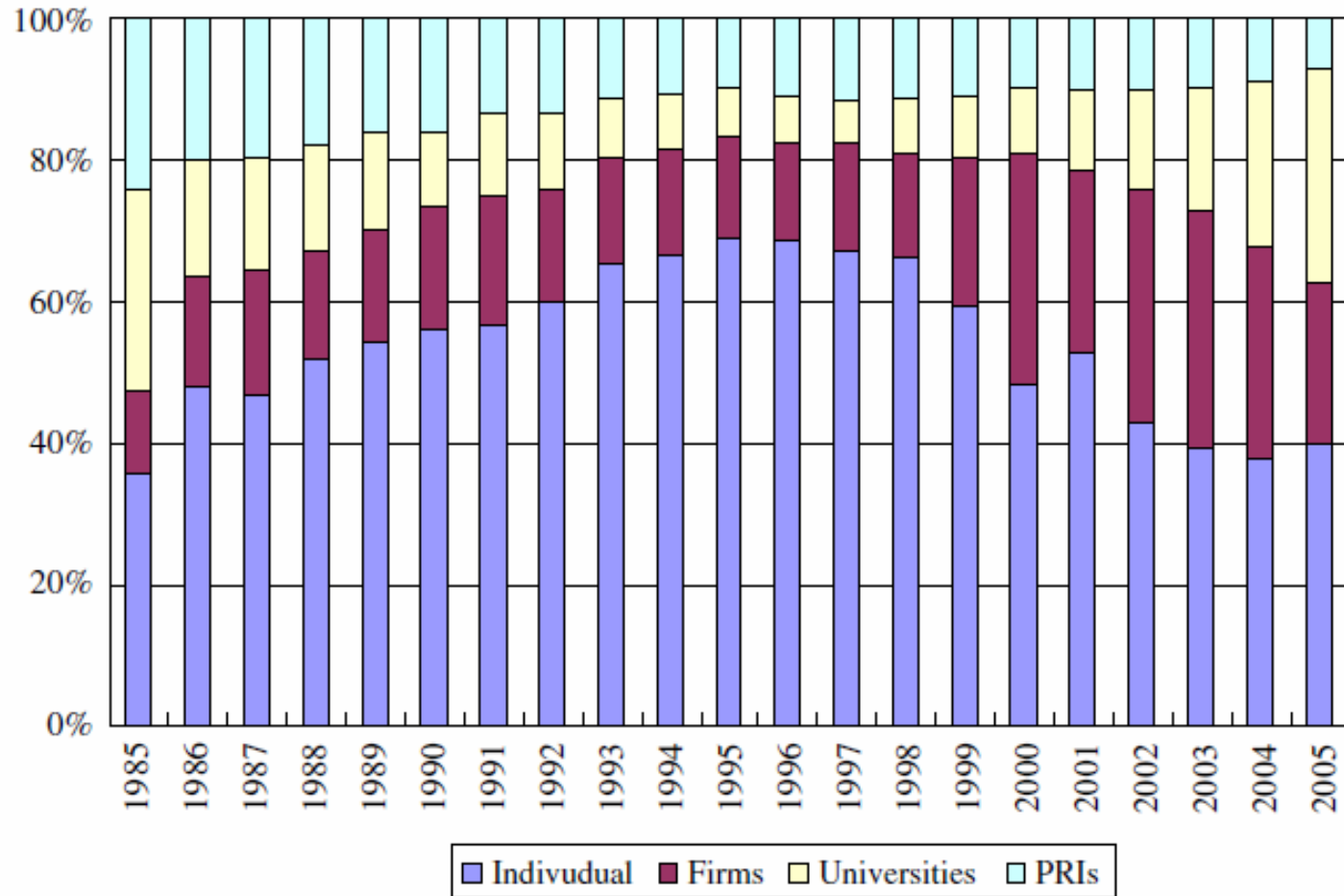
Difference between large firms and SMEs in university industry collaboration activities



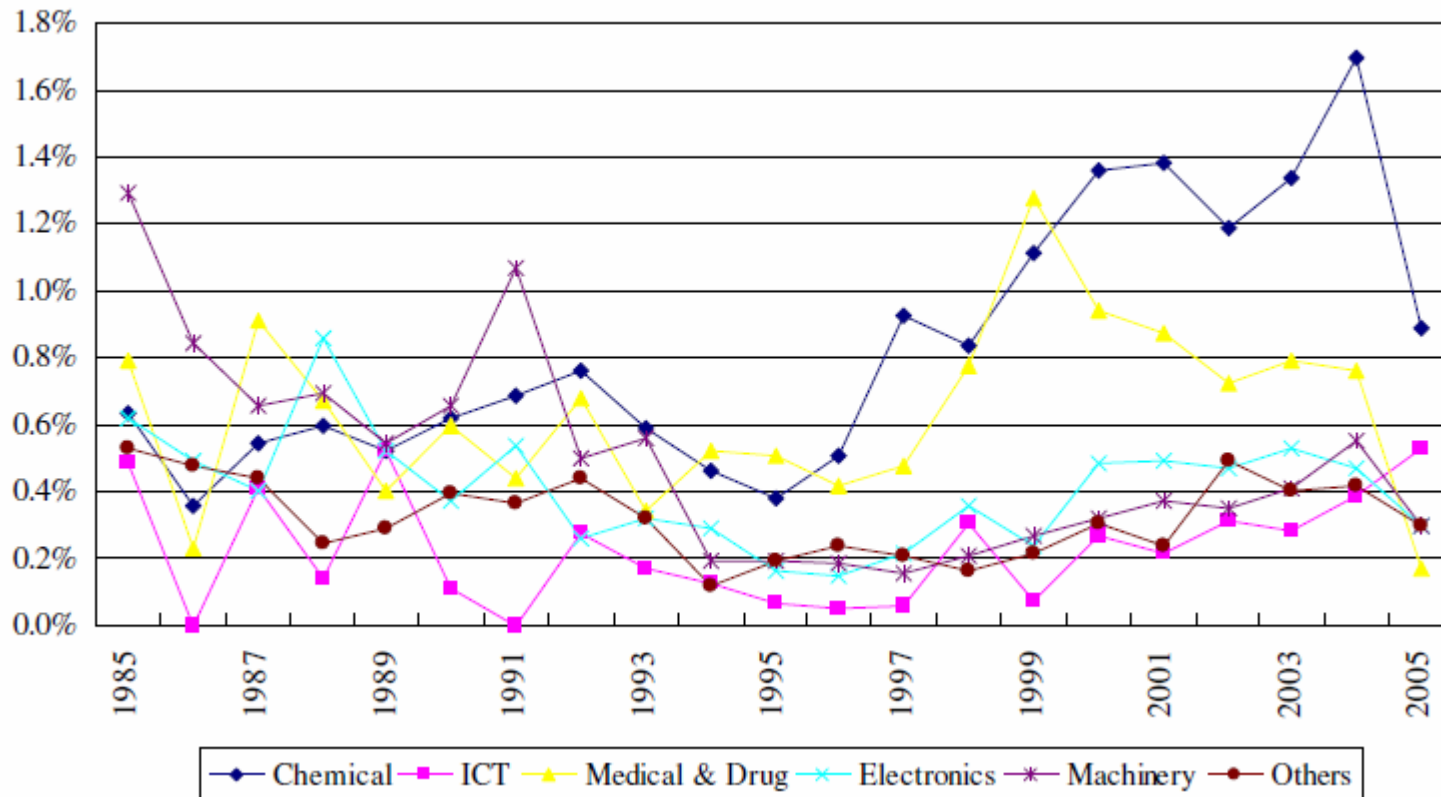
Role of UIC in economic development : a case of PRC



Patent application by type



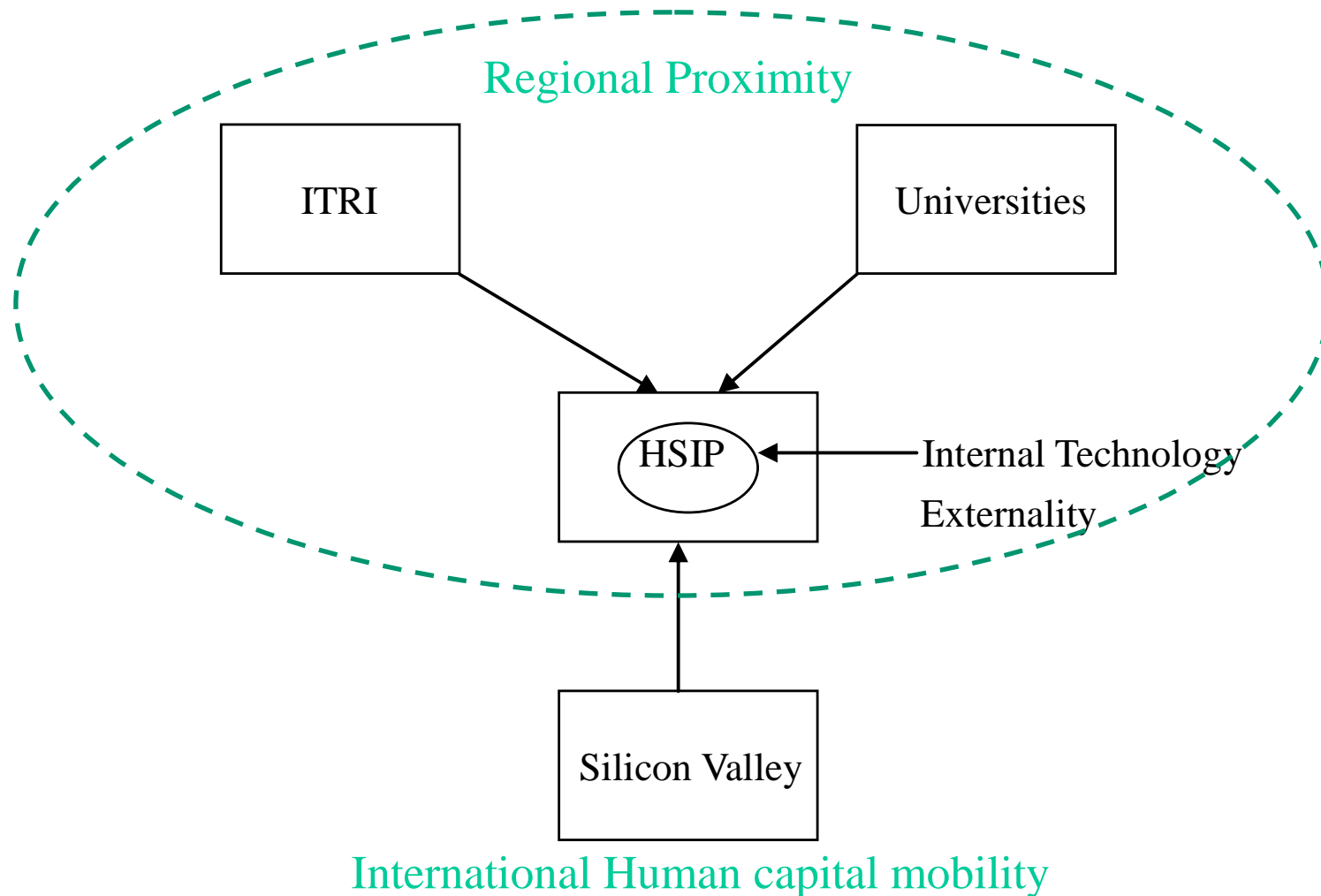
Share of UIC patents by technology



Motohashi, 2008

Regional Cluster Policy

A Case of Hsinchu Science Industrial Park (HSIP) in Taiwan



(Yang, Motohashi and Chen (2008))

Conclusion

- Growing trend of open innovation leads to increasing importance of UIC activities and university's IP management.
- UIC activities spur SME innovation and network style innovation system.
- The role of university in NIS is important for developing countries, where technology level at private sector is relatively low.
- Technology development strategy at PRIs (public research institutions) is also important in technological catching up