

Does Active Use of Technology Market Spur R&D? : Empirical Analysis of IP Strategy of Japanese Firms

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Research Motivation

- Active use of external technology for Japanese firms: depart from in-house R&D innovation system?
- Growing importance of IP strategy at firm
- Pro-patent IPR reform in Japan: evaluation?

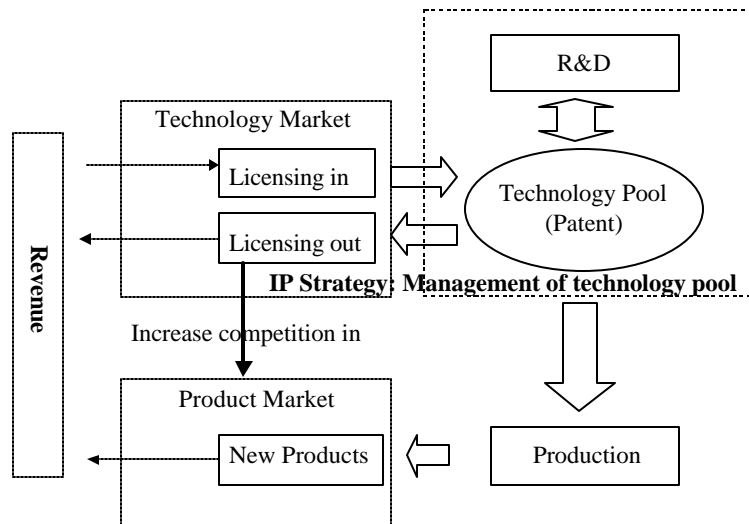


Importance of empirical analysis of firm level IP strategy

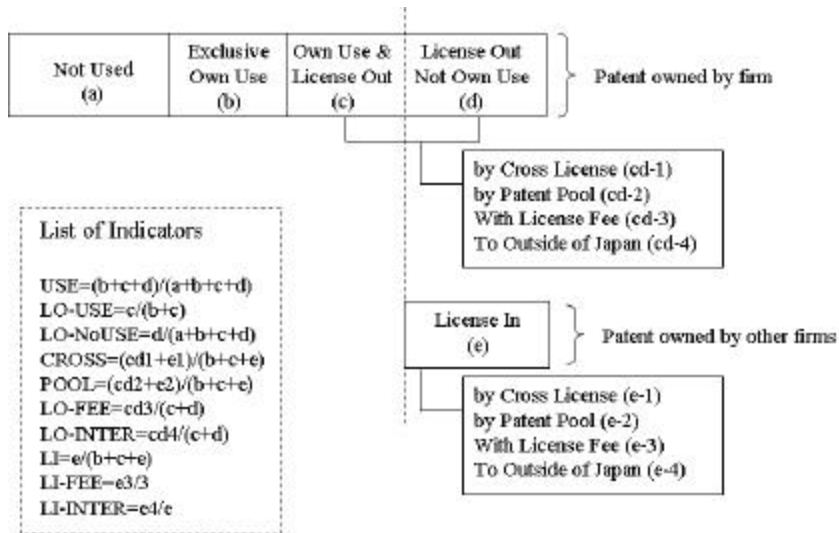
Data

- JPO's Survey on IP related activities
- Started in 2002 (for 2001 activities) and 2003 (for 2002) data are also available
- 6,000-7,000 samples out of 16,000 mailing lists
 - Only firm data are used (5,456 for 2002 and 6,072 for 2003)
- Survey items
 - IPR applications information
 - IPR stocks and its usage
 - Information on IPR section at firm
 - IP related infringement

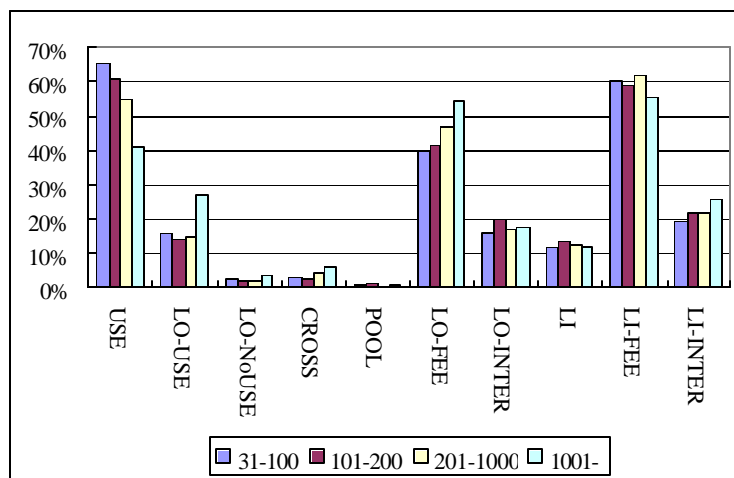
IP strategy analysis: framework



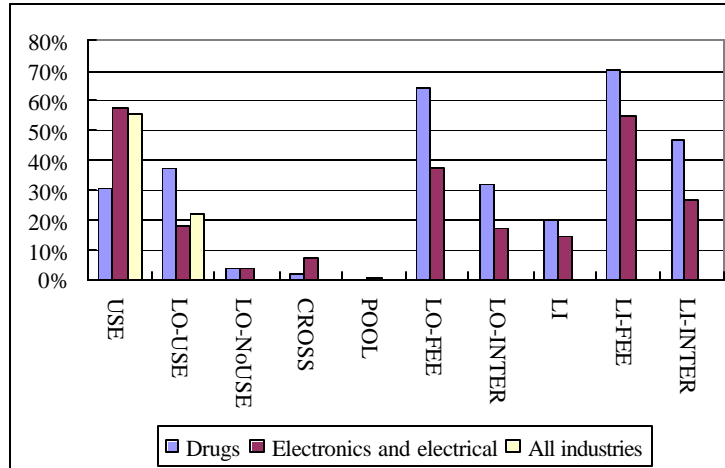
IP strategy indicators by JPO survey



Descriptive statistics: size distribution



Descriptive statistics: industry distribution



Descriptive Regression

	USE	LO_USE	LO-NoUSE	CROSS	POOL	LO_FEE	LO_INTER	LI	LI_FEE	LI_INTER	LI/S	LO/S
age	0.121 (4.04)**	-0.194 (5.36)**	-0.053 (4.86)**	-0.017 (0.99)	0.008 (0.97)	-0.062 (0.93)	-0.057 (1.33)	-0.03 (1.13)	0.072 (0.71)	0.008 (0.11)	-0.009 (3.99)**	-0.092 (7.83)**
sale	0.005 (0.46)	-0.064 (4.97)**	-0.019 (4.92)**	0.002 (0.27)	0.002 (0.59)	-0.033 (1.49)	-0.017 (1.18)	0.022 (2.33)*	0.026 (0.72)	0.012 (0.43)		
saleage	-0.011 (3.53)**	0.015 (4.08)**	0.005 (4.03)**	0 (0.13)	-0.001 (1.06)	0.006 (0.94)	0.004 (1.04)	0 (0.11)	-0.004 (0.38)	-0.002 (0.30)		
ipemp	0 (0.01)	0.002 (4.58)**	0 (3.66)**	0 (2.62)**	0 (0.40)	-0.001 (2.78)**	0 (1.00)	0.001 (2.20)*	-0.001 (1.72)	0 (1.31)	0 (2.77)**	0 (0.69)
techhtl	0.103 (4.44)**	0.004 (0.14)	-0.001 (0.11)	0 (0.03)	-0.003 (0.49)	-0.119 (2.54)*	0.057 (1.87)	-0.02 (1.07)	-0.087 (1.79)	-0.019 (0.55)	0.003 (1.60)	-0.001 (0.27)
patsize		0.04 (8.42)**	0.00 -1.23	0.01 (3.42)**	0.00 -0.02	0.04 (3.66)**	0.02 (2.62)**	(0.02) (5.27)**	(0.04) (3.36)**	0.02 -1.84	0.00 -0.94	0.00 -1.03
emp											-0.005 (3.89)**	-0.055 (7.93)**
empage											0.001 (3.65)**	0.013 (7.61)**
Constant	0.816 (2.67)**	0.715 (2.28)*	0.242 (2.24)*	0.02 (0.13)	-0.014 (0.20)	1.237 (2.61)**	0.162 (0.53)	0.134 (0.58)	0 (.)	0 (.)	0.028 (2.03)*	0 (.)
Observations	4276	3298	4276	3408	3368	1575	1573	3408	1421	1419	2851	2851
Number of id	3191	2514	3191	2594	2567	1181	1180	2594	1062	1061	2299	2299

Absolute value of z statistics in parentheses
 * significant at 5%; ** significant at 1%

Typology of IP Strategy (after controlling for industry and technology)

Variable	PC1	PC2	PC3
USE	0.184	0.637	-0.013
LO_USE	0.517	-0.207	0.176
LO-NoUSE	0.434	0.411	0.181
CROSS	0.509	-0.182	0.055
POOL	0.202	0.139	-0.526
LO_FEE	-0.368	-0.069	0.308
LO_INTER	0.032	0.100	0.750
LI	0.272	-0.561	0.001
Cumulative VA	0.234	0.407	0.538

PC1: Open licensing strategy

PC2: Technology provider strategy

PC3: Selectively licensing strategy

IP Strategy and R&D

	RD	RD	RD	RD	RD-HI	RD-HI	RD-HI	RD-HI
	Random	Random	IV	Random	Random	Random	IV	Random
PC1	-0.029 (1.17)	0.034 (1.48)	0.029 (1.23)	0.137 (2.31)*	0.014 (2.67)**	0.009 (1.76)	0.010 (1.80)	0.012 (0.89)
PC2	-0.097 (3.24)**	-0.024 (0.86)	-0.033 (1.18)	0.090 (1.34)	0.006 (0.92)	-0.001 (0.15)	0.000 (0.08)	-0.028 (1.86)
PC3	0.049 (1.54)	0.044 (1.51)	0.031 (1.03)	0.054 (0.71)	0.006 (0.99)	0.006 (0.99)	0.008 (1.13)	-0.014 (0.73)
sale	0.241 (2.93)**	0.393 (5.29)**	0.399 (5.05)**	0.417 (5.58)**	0.025 (1.28)	0.013 (0.67)	0.015 (0.72)	0.010 (0.53)
sale**2	0.032 (7.15)**	0.008 (1.83)	0.007 (1.67)	0.006 (1.47)	-0.004 (4.22)**	-0.002 (1.87)	-0.002 (1.86)	-0.002 (1.74)
patsize		0.490 (16.87)**	0.486 (16.39)**	0.506 (17.12)**		-0.050 (7.64)**	-0.050 (7.30)**	-0.051 (7.68)**
PC1*patsize				-0.022 (2.02)*				-0.001 (0.23)
PC2*patsize				-0.024 (1.97)*				0.005 (1.93)
PC3*patsize				0.000 (0.02)				0.004 (1.12)
Constant	-0.006 (0.01)	-0.819 (0.91)	-1.154 (1.62)	-0.907 (1.01)	1.375 (5.20)**	1.530 (5.90)**	1.081 (5.49)**	- -
Observations	1445	1445	1375	1445	1331	1331	1274	1331
Number of id	1105	1105	1061	1105	1019	1019	983	1019

Conclusion

- JPO's SIPA: useful and unique data source for analyzing firm's IP strategy
- Significant firm level heterogeneity: even after controlling for industry and technology
 - Smaller and younger firms use technology market more
- Open strategy: small patsize firms do R&D more, but it is not the case for large patsize firms
- Difficulty in economy-wide IP policy (changes firm level distribution of strategy?)
- Pro-patent (stronger patent) policy leads to activate small firms' R&D with open strategy