



Can Purchasing IP Service Effectively Sustain Innovation in China?

—A Study of Corporate IP Service Purchasing Behaviors

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Intellectual Property Service?

IP service is a new yet steadily growing industry that

- Provides a complete set of services on the **acquisition, utilization and protection** of IP
- Promotes the **validation, commercialization and industrialization** of IP and thus enhances core corporate competence
- Patent attorney and lawyer V.S. IP agency, IP law, IP information and data, IP finance, IP consulting and training

IP agency and law service - 01 domestic application - 02 overseas application – 03 IP invalidation – 04 IP maintenance - 05 IP rights assistance – 06 administrative litigation - 07 IP disputes (such as ownership, contract,) – 08 public welfare legal service

IP data and information service - 09 information retrieval - 10 early warning analyses - 11 patent database - 12 software and IP management system - 13 scale IP data processing - 14 patent translations - 15 cloud IP information

IP commercialization and finance services - 16 IP evaluation - 17 patent document transaction - 18 IP pledge/trust (as collateral) - 19 IP investment (VC) – 20 patent incubation into products - 21 patent insurance - 22 patent securitization

IP consulting and training services - 23 technology consulting - 24 patent products and market consulting - 25 government project- 26 enterprise strategy and management-27 related high-tech enterprises advisory – 29 market professional skills – 30 government project and association training

Overview of IP Service Market in China

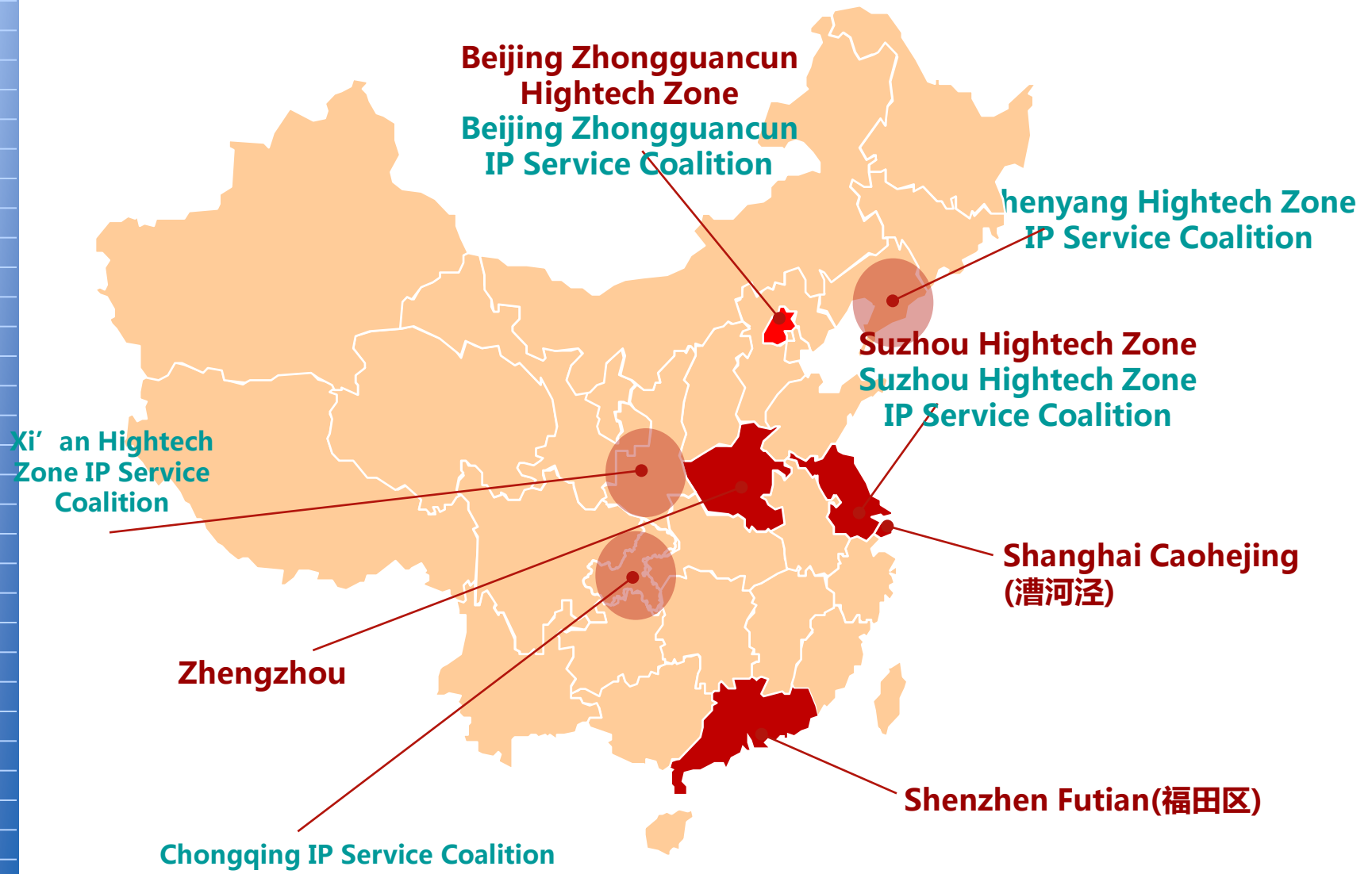


1. **Considerable Market Size:** More than 270,000 organizations providing IP service in China, 442,600 employees, accounting for roughly 0.1 % of total labor force in the service sector of China.
2. **Fast grow:** During 2004~2014, the number of IP service organizations grows at an annual rate of 24%, and the population of their employees grows even faster at 24.8%.
3. **Synergy effect and Coalition Rises :** over 50% of the organizations located in Beijing, Guangdong, Shanghai.

Date source: National organizational code Center: as of June 2014

1. **Policy sensitive:** firms cater to government requirements instead of intrinsic demand
2. **Weak demand:** self-satisfied while market still weak
3. **Low price and low quality:** low willingness to pay
4. **High quality service usage:** mainly utilized by certain firms, stable partnership between foreign firms and domestic IP service providers

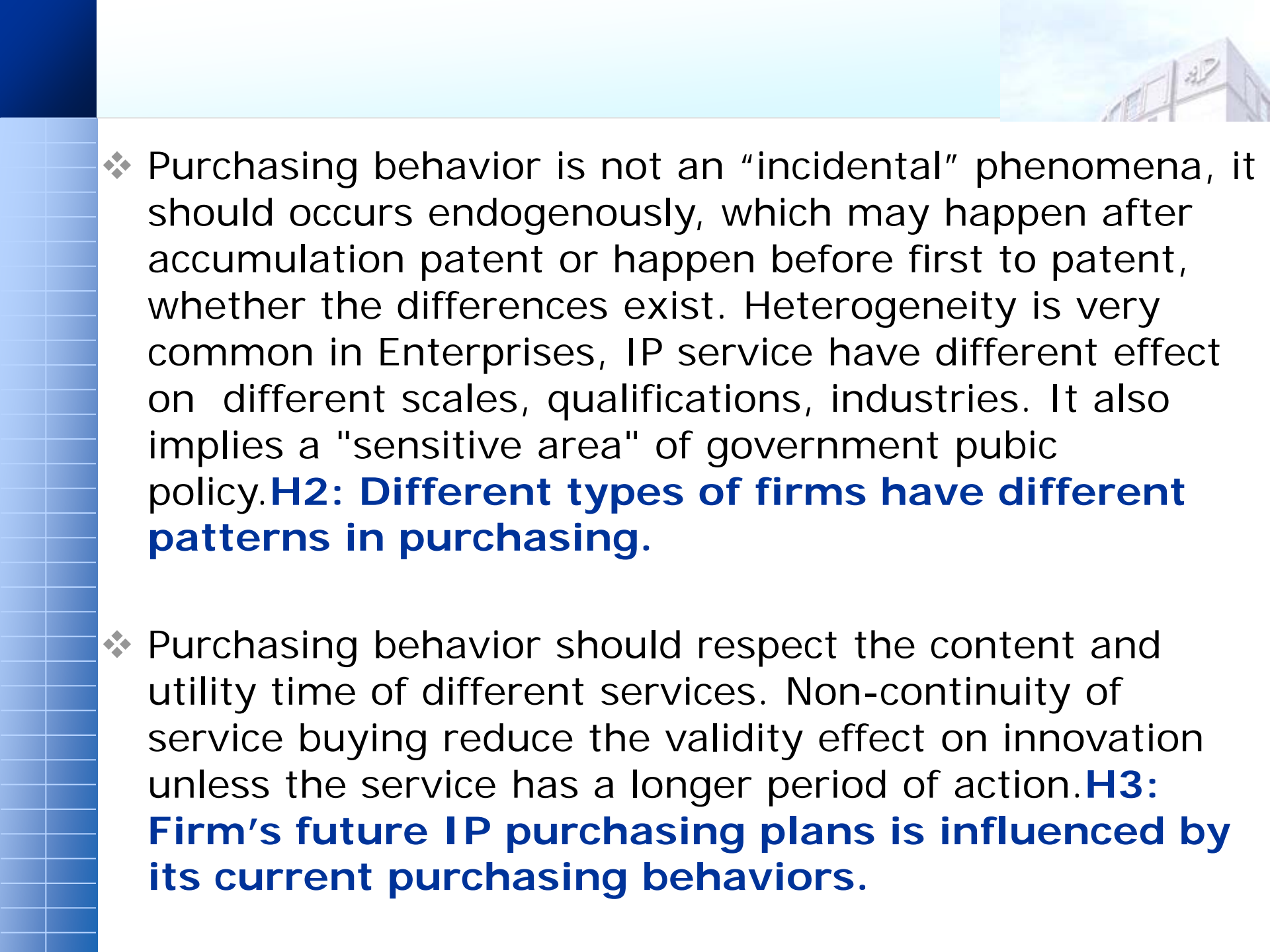
Data source: National patent survey



Questions & Motivations:

Can Purchasing IP Service Effectively Sustain Innovation in China? Patterns of Corporate IP Service Purchasing Behaviors

- ❖ Effectively support innovation's purchasing should be consistent with rational decision. Corporate capacity of IP management , patent level and cumulative patent should have significant impact. **H1: Firm's current IP capacity influences how much IP service and which types it purchases.**

- 
- ❖ Purchasing behavior is not an “incidental” phenomena, it should occurs endogenously, which may happen after accumulation patent or happen before first to patent, whether the differences exist. Heterogeneity is very common in Enterprises, IP service have different effect on different scales, qualifications, industries. It also implies a "sensitive area" of government public policy.**H2: Different types of firms have different patterns in purchasing.**
 - ❖ Purchasing behavior should respect the content and utility time of different services. Non-continuity of service buying reduce the validity effect on innovation unless the service has a longer period of action.**H3: Firm’s future IP purchasing plans is influenced by its current purchasing behaviors.**

Positioning of IP Service: Knowledge-based Service

SERVICE

Producer Service

Producer services are forms of service sold primarily to business and government clients as intermediate inputs to further production activities.

IP Service

Consumer Service

Consumer services have their primary markets with households for final consumption.

SERVICE

Traditional Service

It involves the provision of services to other businesses as well as final consumers. Services may involve the transport, distribution and sale of goods from producer to a consumer, or the provision of a service.

Modern Service

Modern service is a kind of inherit, improvement and innovation of traditional service during industrial upgrade.

High-tech Service

IP Service

❖ Knowledge-based Service

- **Highly professional:** Hertog and Bilderbeek(1998), Kemppila and Mettanen(2001), Hauknes(1998), etc.
- **Implicit knowledge:** Antonelli (1999)
- **Intensive interaction:** Muller and Zenker(2001). Kemppila and Mettanen(2001), etc.
- **Value-adding instead of purely value-transferring:** Muller and Zenker(2001), Benson and Smith(1998), 李晨松和金生(2005)

❖ Producer Service

- **Enhances productivity:** Riddle(1986), Pappas(1998), Eswaran(2001),etc.
- **Increasing return to scale:** Markusen(1989)

❖ Modern Service: kind of inherit, improvement and innovation of traditional service during industrial upgrade.

❖ IP Service and corporate innovations

- IP service **covers the whole process of IP chain**
- IP service **reduces information asymmetry**
 - Accelerate knowledge diffused: Davenport(1998)
 - Reduce search costs, transaction costs and reverse selection in technology market: Benson and Smith(1998)
- IP service **promotes innovation**
 - IP motivates firms to innovate
 - IP service enhances the motivation by lowering costs and risks
- IP service **creates value** instead of purely transferring value as a type of knowledge-intensive service

China Patent Database (SIPO)

- ※ application and publication number, application and publication date, patent number, title, International Patent Classification (IPC) class, abstract, claims, region, renewal records, IP agency records and so on.

China Patent Survey Database(SIPO) 2013: *Firms 13744, Firms patent 30759*

- ❖ The survey has begun from 2008 and has been taken annually .
- ❖ The samples were based on the granted patents of the last year. More than 40,000 patents and 15,000 patentees every year, and the selected sample in 70 cities more or less.
- ❖ Survey Questionnaires: Basic information, Management Survey, and Patent Implementation Survey
- ❖ SIPO took full responsibility of the whole survey while the local bureau issued and recovered questionnaires.
- ❖ Annual Recovering Ratio all exceeds 80%.10% samples were chosen to recheck.

Corporate IP
purchasing behavioral

Fixed Effects

$$Y_i = \alpha_0 + \alpha_1 X_i + \alpha_2 \mu_i + \varepsilon_i$$

←

Firm Characteristics

Error Term

OLS + Probit Model

Assumptions

- ❖ H1: Firm's current IP capacity influences how much IP service and which types it purchases
- ❖ H2: Different types of firms have different patterns in purchasing.
- ❖ H3: Firm's future IP purchasing plans is influenced by its current purchasing behaviors

❖ Firm Type

- State-owned? Ip-quality certification? High-tech? listed? Professional ip management team?

❖ Patent Level

- *Total number of patents*
- *The number of years with new patents authorized*
- *Invention patent as share of total patents*
- Firm's self-report about its patent status

❖ Patent Investment

- Research expenses as share of corporate income
- Ip service purchasing expense as share of profits/income
- ip service demand measured by whether the firm takes ip service purchasing seriously

❖ IP Service Purchasing History

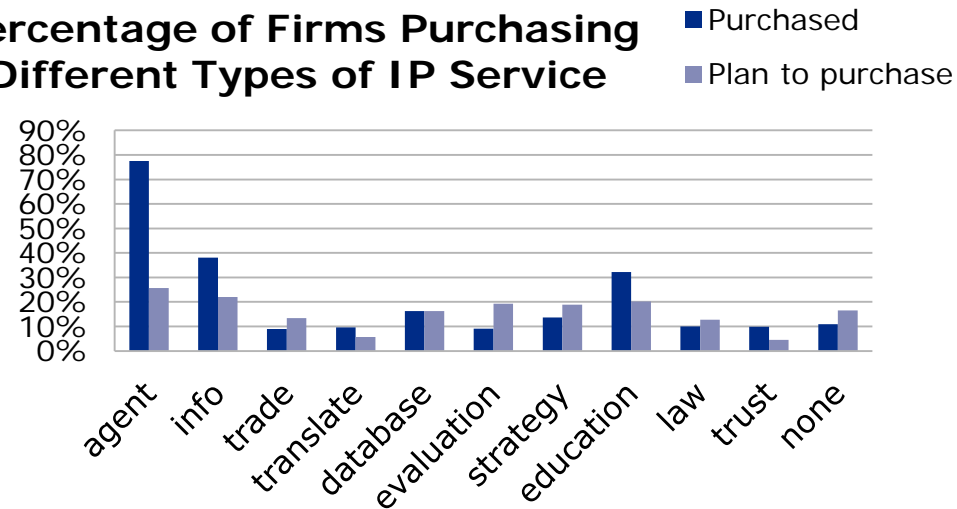
- Which types of IP service has the firm purchased?

❖ IP Service Purchasing Plan

- Which types of IP service will the firm purchase?

Firm Type	Yes	Percentage
<i>ip_quality</i>	2458	30.1%
<i>high-tech</i>	4829	58.2%
Listed firms	903	10.8%
<i>central</i>	628	7.5%
<i>size_big</i>	1593	19.0%
<i>size_small</i>	3894	45.7%
<i>ip_manage</i>	7028	83.4%

Percentage of Firms Purchasing
Different Types of IP Service



Patent Level	# of firms	mean	std	min	max
<i>st</i>	8474	3.419519	0.74602	1	5
<i>total</i>	8523	42.25378	223.8926	0	12027
<i>no_years</i>	5231	3.445039	1.751478	1	7
<i>invent_share</i>	5231	0.15592	0.286901	0	1
<i>research_income</i>	4688	0.071327	0.056707	0.007236	0.2
<i>ip_profits</i>	4052	0.023078	0.035937	3.11E-05	0.187032
<i>ip_income</i>	4205	0.001843	0.001403	0.00098	0.005073

Background

Literature

Methodology
and ConclusionsFurther
Studies

Data Source

Model Design

Result: Regression

Conclusions

VARIABLES	(1)	(2)	(3)	(4)	(5)	
	<i>ip_income</i>	<i>ip_profit</i>	<i>research_inc</i>	<i>None (already)</i>	<i>None(Plan to)</i>	
Firm Type	<i>ip_quality</i>	0.000139** (5.61e-05)	0.00360** (0.00143)	0.00256 (0.00226)	0.0703 (0.0612)	-0.0937* (0.0531)
	<i>High-tech</i>	-0.000237*** (6.10e-05)	-0.00672*** (0.00158)	0.00432* (0.00246)	0.00258 (0.0613)	-0.0815 (0.0516)
	<i>listed</i>	-0.000179** (7.63e-05)	-0.00465** (0.00188)	0.00351 (0.00303)	0.0164 (0.0876)	-0.0677 (0.0750)
	<i>central</i>	-0.000152 (9.47e-05)	-0.00273 (0.00224)	0.00239 (0.00369)	-0.143 (0.118)	-0.0673 (0.0936)
	<i>ip_manage</i>	-0.000157* (9.03e-05)	-0.00390 (0.00244)	-0.00271 (0.00365)	-0.432*** (0.0722)	-0.240*** (0.0660)
	<i>size_big</i>	-0.000241*** (6.98e-05)	-0.00852*** (0.00167)	-0.00870*** (0.00274)	0.167** (0.0782)	-0.00856 (0.0662)
	<i>size_s</i>	0.000706*** (5.61e-05)	0.0148*** (0.00153)	0.0296*** (0.00234)	0.160** (0.0629)	0.0329 (0.0534)
	<i>st</i>	5.21e-05 (3.41e-05)	0.000703 (0.000879)	0.00113 (0.00136)	0.0521 (0.0363)	-0.0772** (0.0313)
Patent Level	<i>total</i>	3.99e-07*** (1.44e-07)	3.15e-06 (2.14e-06)	-3.49e-06 (3.43e-06)	-0.000385* (0.000221)	-7.68e-06 (8.34e-05)
	<i>invent_share</i>	6.31e-05 (8.68e-05)	-0.00379* (0.00223)	0.0240*** (0.00348)	-0.249** (0.0995)	0.0177 (0.0796)
	<i>number_years</i>	-2.38e-05 (1.48e-05)	-0.000692* (0.000376)	-0.000594 (0.000598)	-0.0600*** (0.0176)	-0.0138 (0.0142)
	IP Service	<i>ip_dmd</i>	8.14e-06 (5.41e-05)	0.00106 (0.00141)	0.00151 (0.00221)	-0.267*** (0.0543)
<i>none</i>				-0.00383 (0.00614)		

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VARIABLES

buy_agent buy_info buy_trade buy_trans buy_db buy_value buy_stra buy_edu buy_law buy_trust buy_none

Already Purchased **0.799***** **0.0211** **0.317***** **0.385***** -0.106 0.00287 **-0.187**** 0.0589 **0.283***** **0.477***** **1.578*****

st 0.0928** -0.00247 0.0185 0.0319 0.0337 0.0663 0.0612* 0.0171 0.0691** -0.0480* 0.092***

total 3.59E-05 -5.23E-05 2.28E-05 0.000358 -7.07E-05 -0.000177 -3.15E-05 0.00026** 2.26E-05 1.11E-05 4.07E-05

Patent

Level

invent_share 0.00181 0.103** -0.138** 0.0428 0.0261 -0.0169 -0.0233 -0.174* -0.140* 0.128 0.12

no_years -0.0151 -0.00082 -0.048*** -0.0193 -0.0109 -0.0281* -0.0174 -0.00098 0.0072 -0.0338* 0.0118

ip_dmd 0.0106 **0.125**** 0.0621 -0.00292 0.0111 **0.147***** **0.181***** **0.105***** **0.212***** 0.0661 0.284***

ip_quality **-0.141***** -0.025 **0.222***** **0.185***** 0.0907* **0.181***** 0.00485 -0.102** 0.058 0.185*** -0.132**

hightech -0.0196 0.0184 -0.0901* 0.0419 **0.129***** -0.0378 **0.177***** 0.07 -0.0728* -0.145* -0.113

Firm
Type

listed -0.0714 -0.0554 -0.029 -0.00851 -0.00296 -0.0367 0.0216 0.0474 0.193** -0.0178 -0.0864

central -0.0262 0.00444 -0.0237 -0.146 0.0261 0.00279 -0.0471 0.0792 **-0.374***** 0.0975 -0.0991

ip_manage -0.0347 0.0587 0.0758 -0.195* 0.166* -0.033 0.0182 0.0673 0.127 -0.0102 -0.111*

Constant -1.48*** -1.31*** -1.54*** -1.73*** -1.70*** -1.48*** -1.75*** -1.34*** -1.85*** -1.61*** -0.54**

Observations 4,860 4,860 4,860 4,860 4,860 4,860 4,860 4,860 4,860 4,860 4,860

Pseudo R² 0.0473 0.0389 0.0443 0.042 0.0425 0.0399 0.053 0.0204 0.0384 0.0415 0.168

❖ Firm Type

- Firms with IP quality certification tend to spend more on IP service purchasing, but high-tech firms and listed firms tend to spend less. It's insignificant for firms managed by central government.
- Smaller firms spend a larger fraction of their profits/income in buying IP service.

❖ Patent Level

- Firms with more patents tend to be more likely to buy IP service and if they do buy, they tend to buy more.
- Firms with higher level of self-satisfaction are more likely to report IP service purchasing plans for the next year, but they do not seem to have more IP service purchasing currently.

❖ Different Types of IP service

- Current purchases influence future purchasing plans.
- Generally, firms with no IP service purchasing experience tend to not purchase in the future.
- Heterogeneity among different types of IP service

Policy Implication

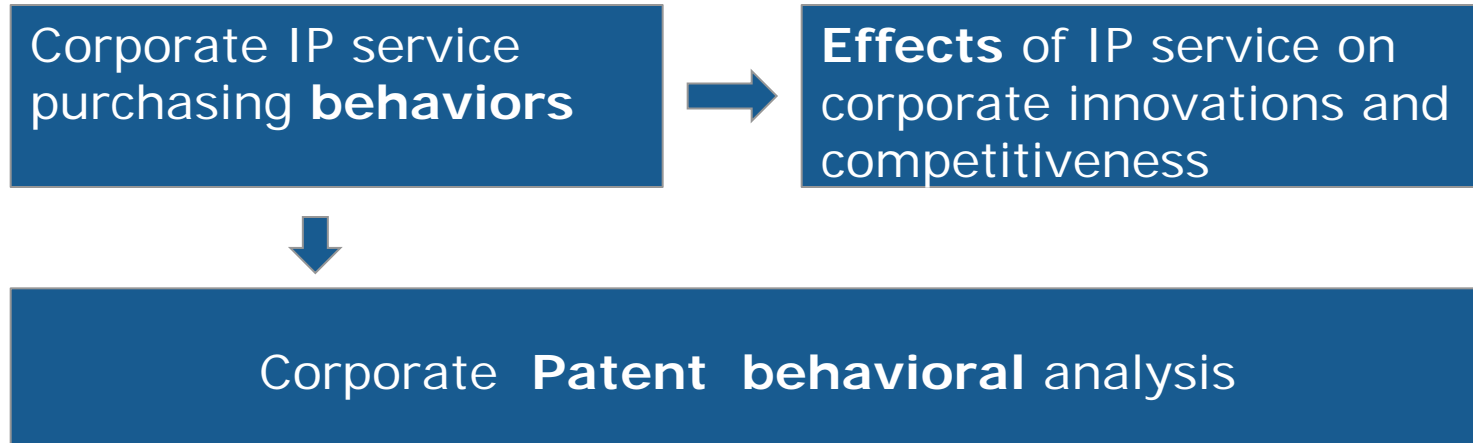
From government perspective

- Moderate intervene market. Avoid feeding bubbles of invalid needs of IP service
- Research on different purchasing behaviors, Foster the real innovation capability
- Encourage high-tech enterprises and listed enterprises to buy the high quality IP services

From Innovative Enterprises

- In the course of the acquisition IP, enhance market competitiveness, improve IP management and other aspects to make full use of IP services
- Build up diversified services purchasing strategy. Enhance the effectiveness of IP service using
- Increase IP services funding input, especially for the high-tech enterprises

Academic Research



- Connect corporate name with industry code. Using Panel data to observe the relationship between behavior changes and innovation structure improvements, which include R&D structure(R&D%), patent structure(PCT% invention%), profit ratio, etc.
- Combine the IP service behaviors with the motivation of patent application and maintain. For example: occupying product market, bargaining, protect technology, advertise, establish standards, patent pool, etc.
- Further with the usage of the patent, which include little scale self-usage, commercialization, transfer, different kinds of license, etc.



Thank You!

State Intellectual Property Office

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