The 29th Regional Cluster Seminar

Possibilities and Problems for the Regional Innovation in Japan

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Ⅰ. Introduction

Brief self-introduction

■Specialty：Economic geography

－Theories relating to industrial location and regional economy－

■Research topics

＜From 1985 to 1997 at the Seinan Gakuin University>

Industrial location and regional economy in Kyushu

in particular semiconductor industry and technopolis regions

＜Since 1997 at the University of Tokyo>

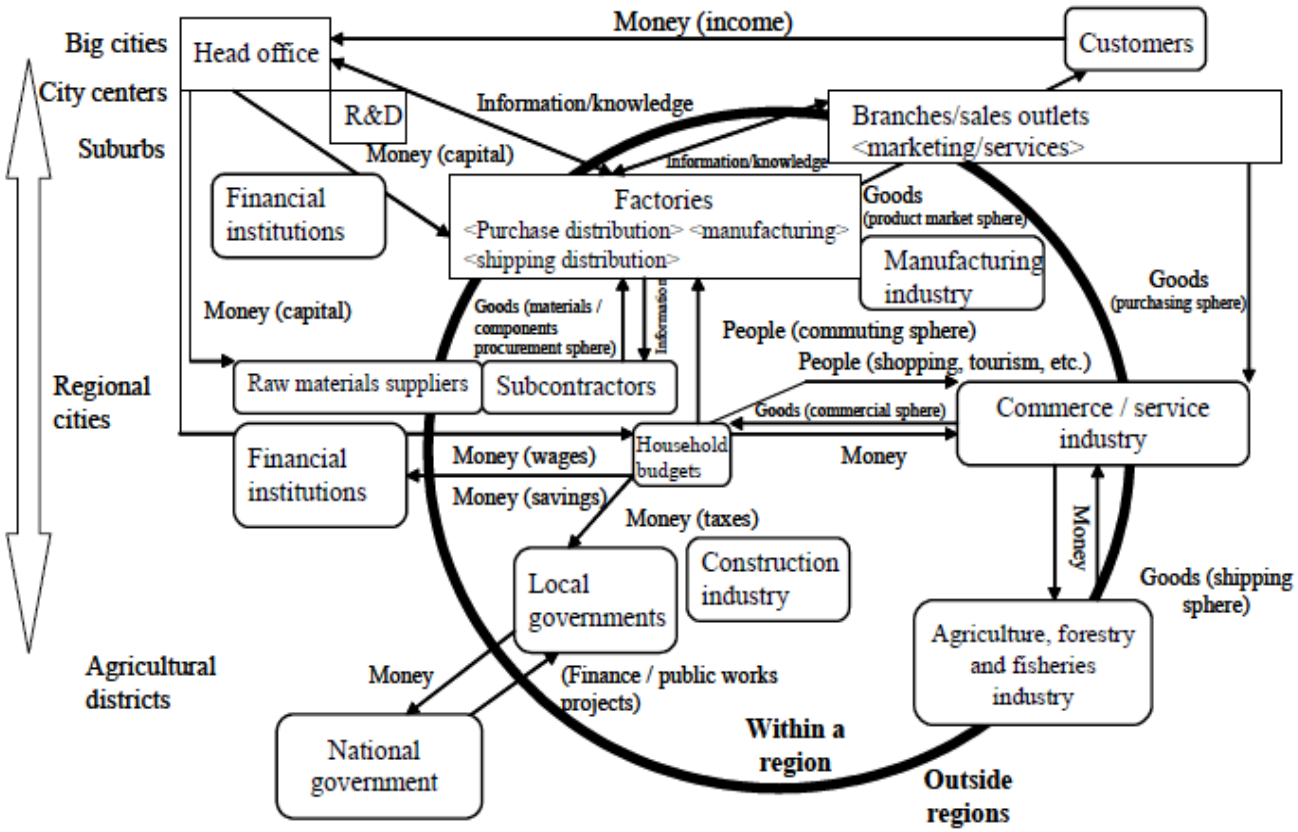
1）Industrial agglomeration theory

2）Industrial cluster projects in Japan

3）Regional economic cyclical model

4）Regional innovation systems

Figure 1: Regional economic cyclical model



Source: Materials for Study Group on Regional Economic Cycles compiled by Associate Professor Hiroshi Matsubara, Tokyo University.

Source: *White paper on international economy and trade 2004*

Contents

1）My recent paper entitled “Spatial Knowledge Flows and Regional Innovation Systems” , *Komaba Studies in Human Geography*, No.18, 2007

2）Regional innovation in Japan’s industrial districts
－ A case in Ube, Yamaguchi Prefecture－

3）Research issues on the regional innovation in Japan

Ⅱ. Summary:

"Spatial Knowledge Flows and Regional Innovation Systems"

1 Contents

- Significance of innovation to competitiveness in cities and industrial districts
- Critical review on regional innovation studies
- Knowledge flows and spaces of innovation

2 Studies on regional innovation system

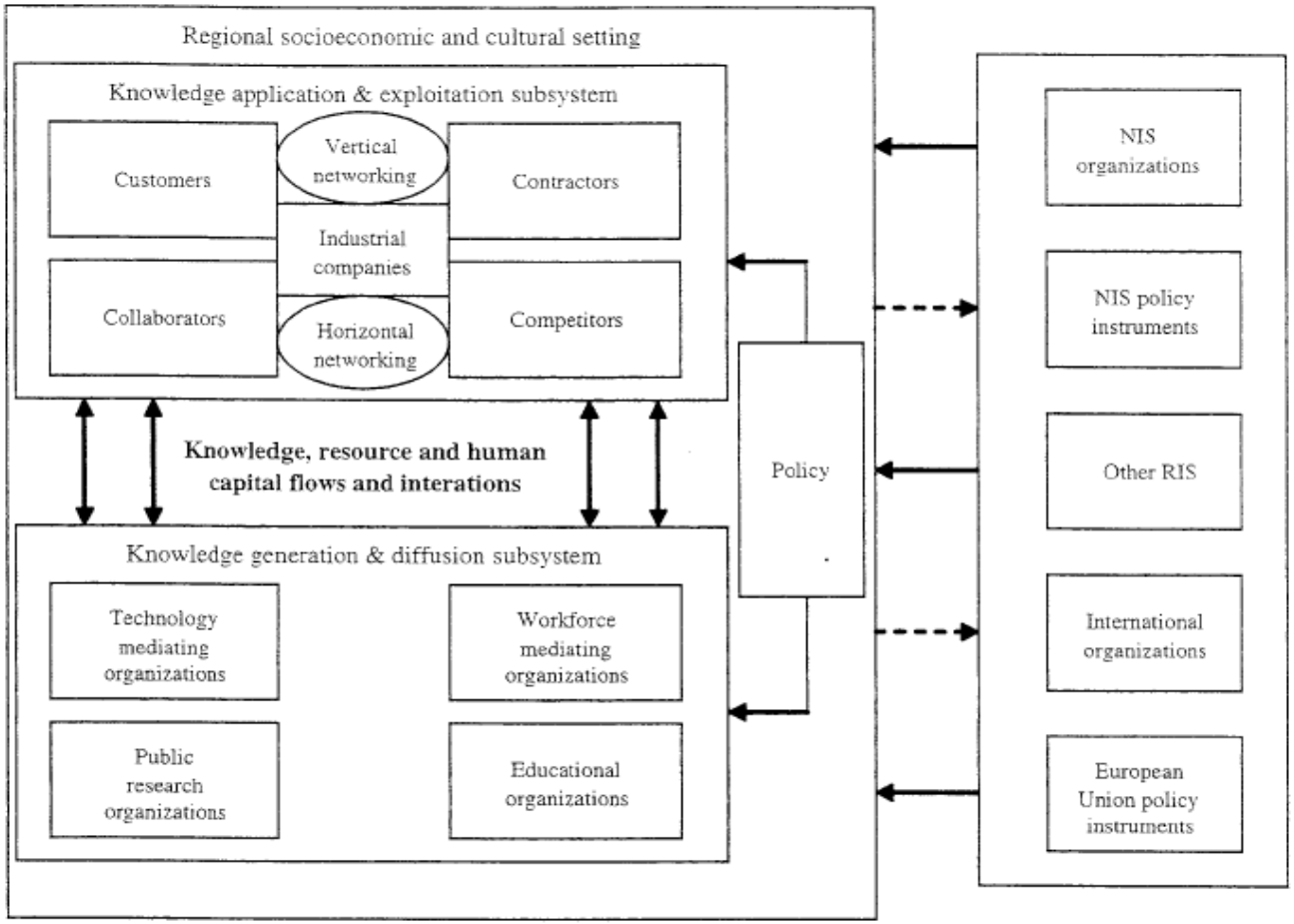


Figure 2 : Main structure of regional innovation system

Source : Tödtling and Trippl(2005) p.1210

Table 1: Regional innovation systems: typology and evolution

	Grassroots	Network	Dirigiste
Localist	Tuscany	Tampere Denmark	Slovenia Tohoku
Interactive	Catalonia	Baden- Würtemburg	Gyeonggi
Globalised	Brabant	North-Rhine Westphalia Wales	Singapore

Source : Cooke,P.,Heidenreich,M. and Braczyk,H-J. eds.(2004)

3 Knowledge flows and Spaces of innovation

Innovation-related knowledge flows in European industry (KNOW) project

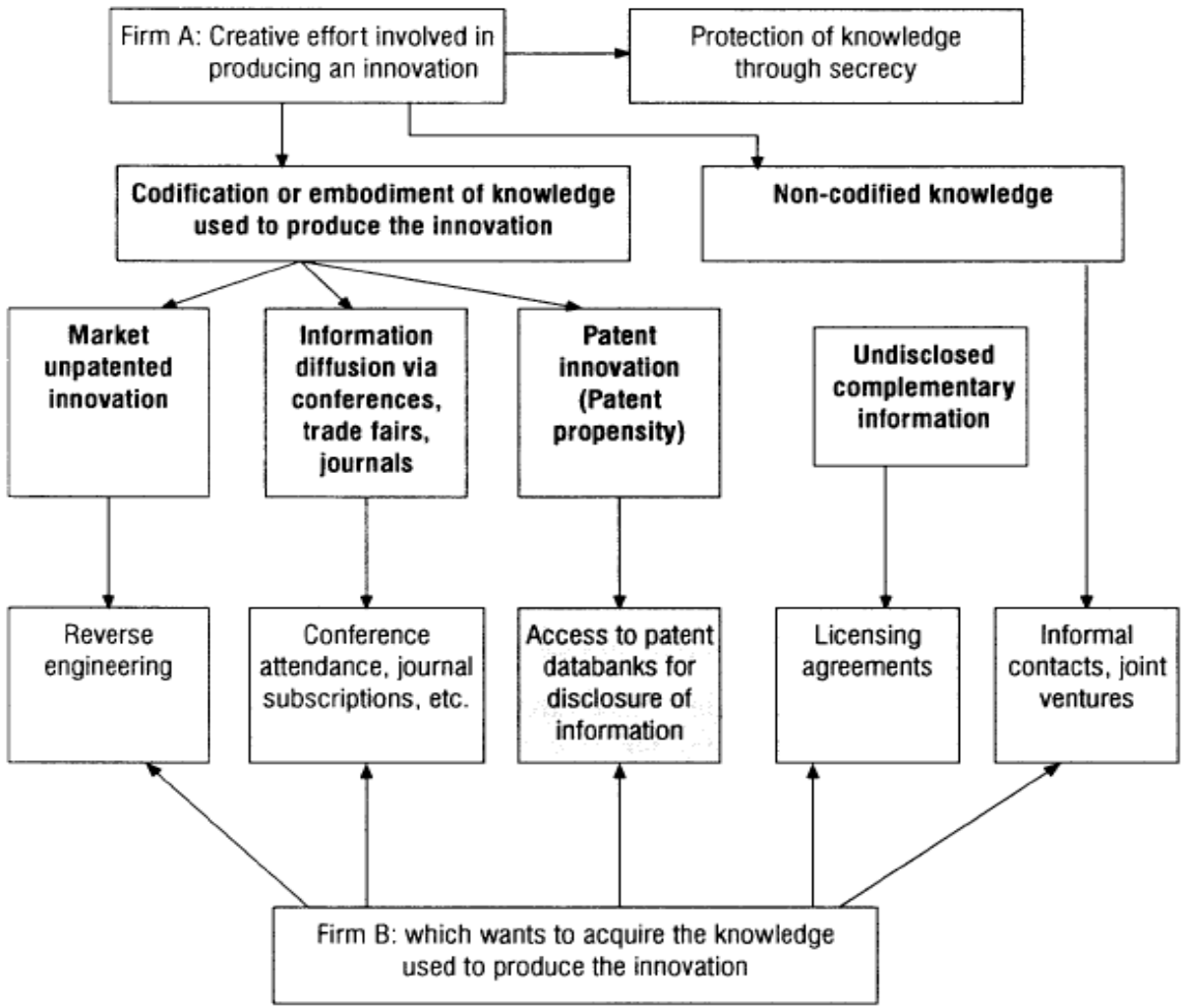


Figure 3: The complexity of knowledge flows

Source: Arundel and Constantelou(2006) p.51

New approach for the quantitative measurement of knowledge flows

1）Source of knowledge（individuals, other firms, academic sector, government agencies）
2)Channels of knowledge (written, verbal, electronic, transfer of personnel et al.)
3）Properties of channels (authority structure, internalized, priced, restricted)
4）Types of knowledge acquired (marketing, scientific, technological, strategic)

Table 2: A typology of knowledge flows in an organizational context

Channel	*Properties*				
	Hierarchical	*Non-hierarchical*			
	Internalized unpriced restricted	*Internalized unpriced restricted*	*Non-priced restricted*	*Internalized unrestricted*	*Priced unrestricted*
Written	Internal reports	Internal reports RJV reports etc.	Consultancy report	Limited circulation paper	Patents Scientific journal
Verbal	Internal meetings	Internal meeting RJV meeting	Consultation	Closed meeting Closed conference Telephone call	Open conference
Electronic	Intra-firm e-mails	Inter-firm e-mails	News alerts	Electronic newsgroups	Internet and web access
Personnel	Internal staff transfer In-house training	Internal staff transfer External staff exchange RJV single lab Formal training	Staff poaching	Quits/hires	Informal learning processes
Product	Internal product exchange	Internal product exchange RJV product exchange	Reverse engineering		
Joint practice	Project meetings Team work	Observations Project meetings Team work			

Source：Caloghirou, Constantelou and Vonortas(2006) p.73

Recent studies on knowledge flows

1）Maskell and Malmberug(1999):
tacit knowledge and geographical proximity

2）Storper and Venables(2004):
local buzz and global pipeline

3）Asheim and Gertler(2005):
knowledge base (synthetic, analytical, symbolic)

Table 3: Synthetic vs. analytic knowledge base

Synthetic	Analytic
Innovation by application or novel combination of existing knowledge	Innovation by creation of new knowledge
Importance of applied, problem related knowledge (engineering) often through inductive processes	Importance of scientific knowledge often based on deductive processes and formal models
Interactive learning with clients and suppliers	Research collaboration between firms (R&D department) and research organizations
Dominance of tacit knowledge due to more concrete know-how, craft and practical skill	Dominance of codified knowledge due to documentation in patents and publications
Mainly incremental innovation	More radical innovation

Source: Asheim and Gertler (2005)

Spaces of innovation

1）global (global sourcing of knowledge by multinational companies)

2）national (spatial structure and regional disparity of innovation)

3）sub-national (locality, innovative cities, creativity)

Table 4: Typology of knowledge bases and flows

Knowledge base	Geography of	knowledge	flows
	Strong global sources	Global and local sources	Strong local sources
Synthetic		Ontario steel	Sudbury mining Windsor auto parts
Hybrid	Montreal aerospace	Okanagan wine Niagara wine Toronto specialty food	Toronto medical technologies
Analytical	Saskatoon agri-biotech	Montreal, Toronto, Vancouver bio-tech Ottawa telecom photonics	

Source: Gertler, M. and Wolfe, D. (2006)

Regional innovation policy

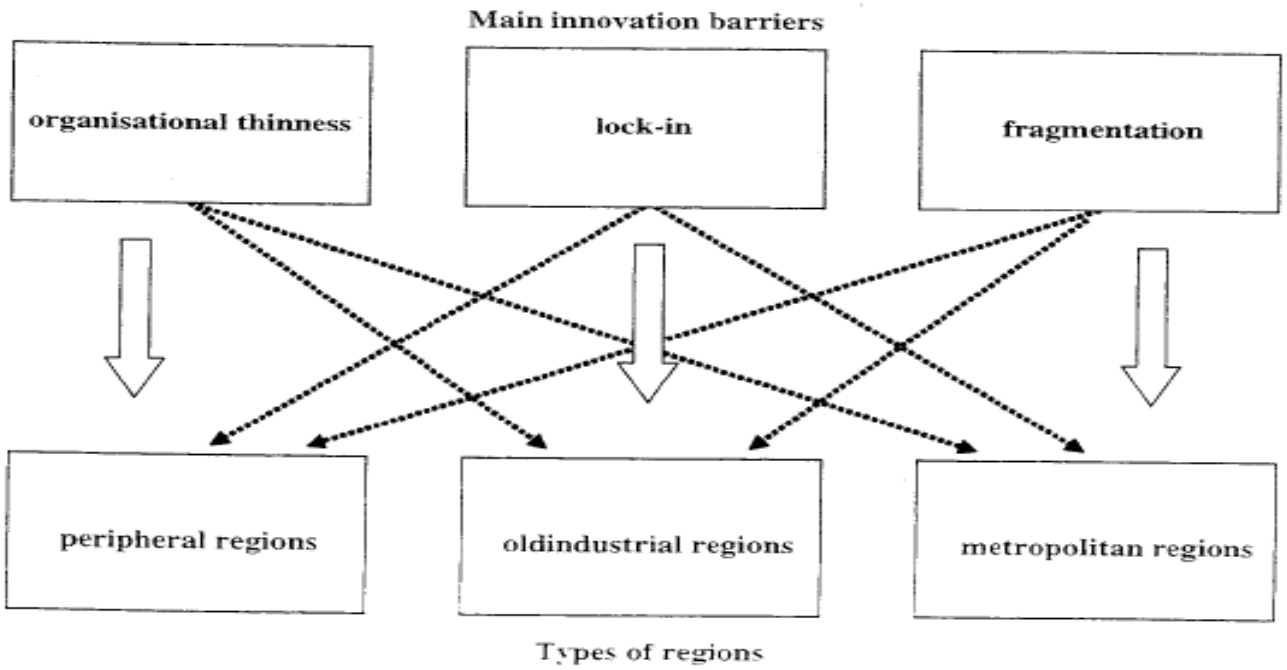


Figure 4: RIS deficiencies and types of problem regions
Source：Tödtling and Trippl(2005)

4 Concluding remarks

- perspectives on Japan’s regional innovation systems-

Ⅲ. Regional innovation in Japan's industrial districts
－A case in Ube, Yamaguchi Prefecture－

1　Overview：Ube City

■Population：178,952 in 2005

■Social economic history

1（pre-WWII）：Emerging of Coal mining industry and major companies

＊specialty of regional culture and society

2（1960s, 70s）：Decline of coal mining industry and restructuring of major companies

＊petrochemical industry, job loss and fine chemical products, transfer of head office

3（1980s, 90s）：Ube Phoenix Technopolis Project

＊Newly establishment of some universities and R&D facilities

4（late 1990s～）：Industry-Academy-Government Collaboration

Figure 5: Population change in Ube City

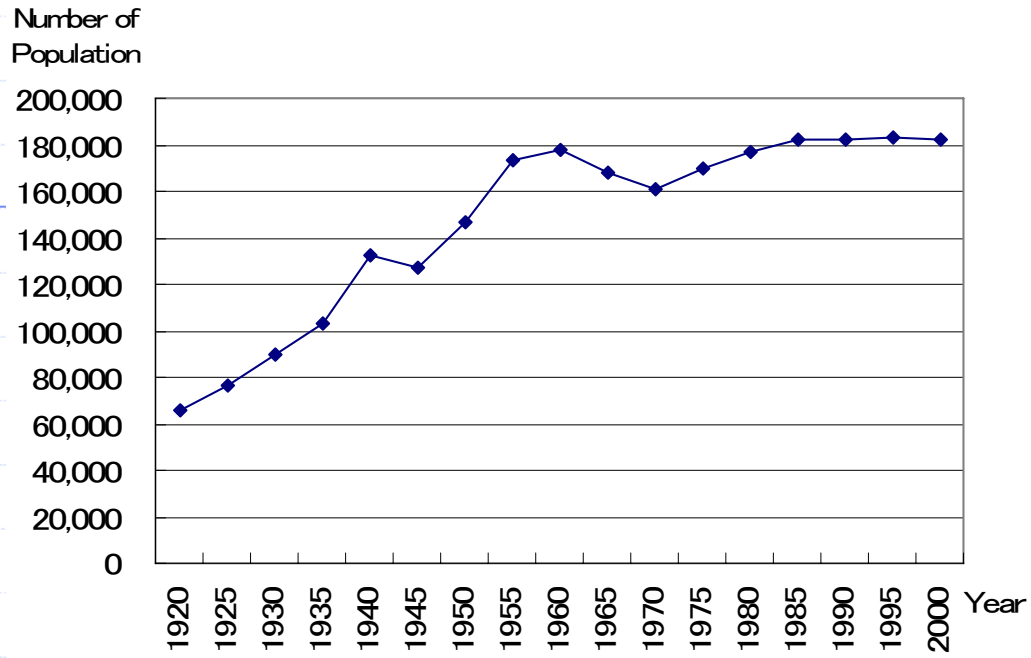
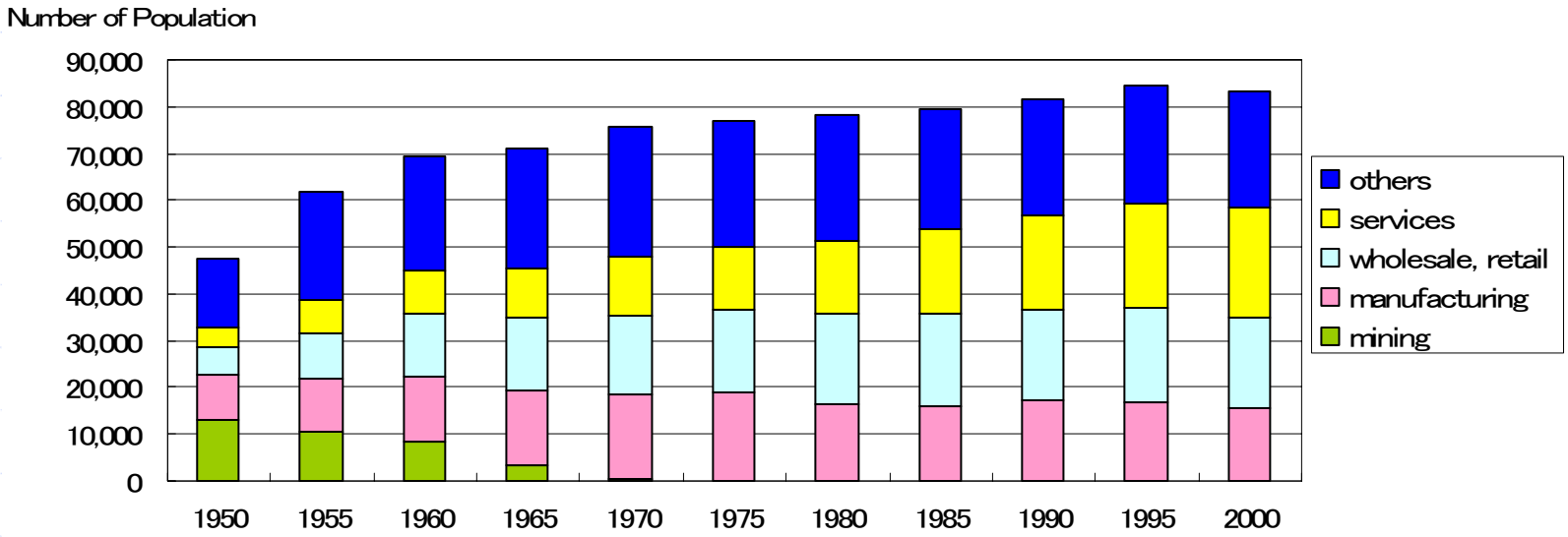


Figure 6: Changes in industrial structure in Ube City



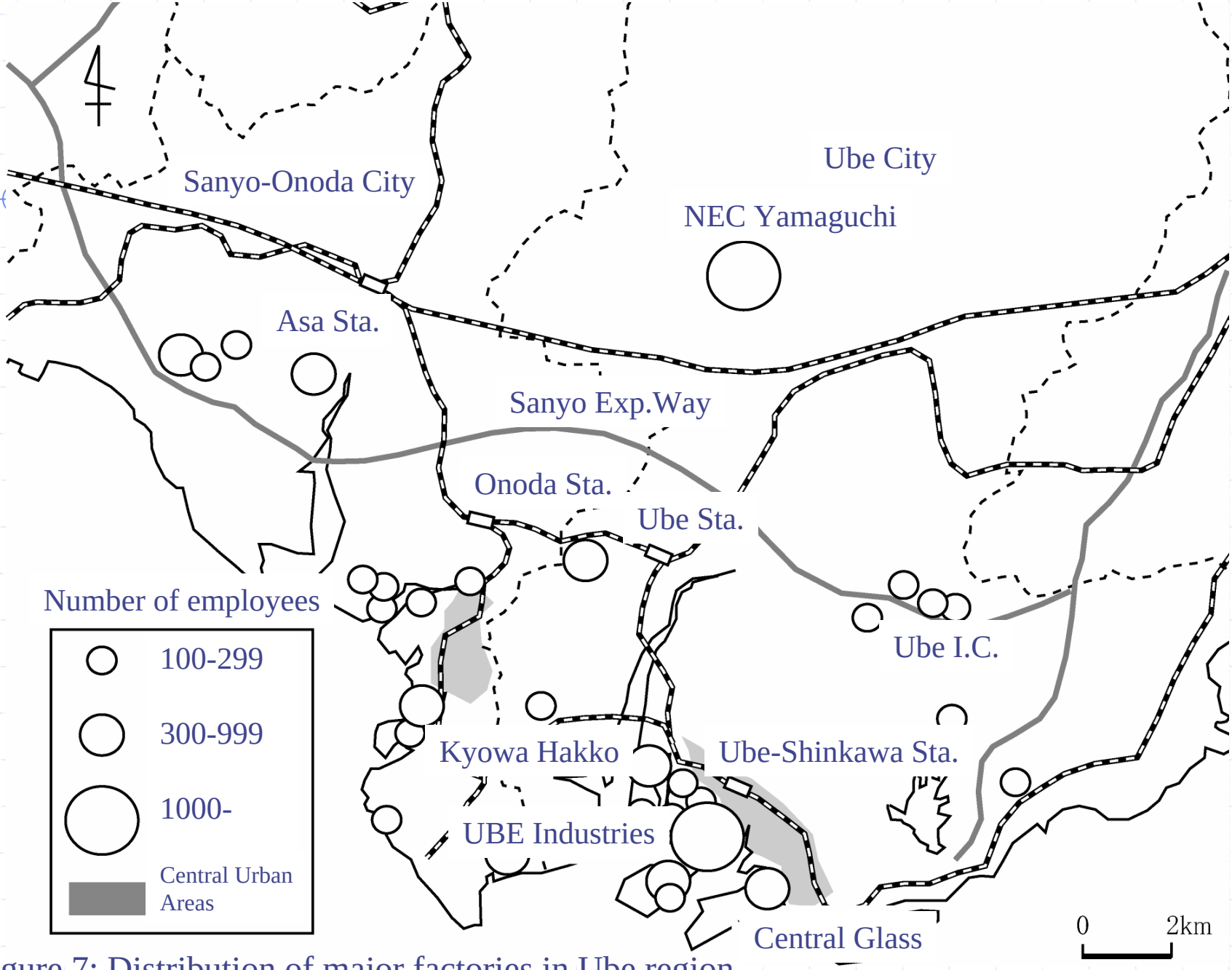


Figure 7: Distribution of major factories in Ube region

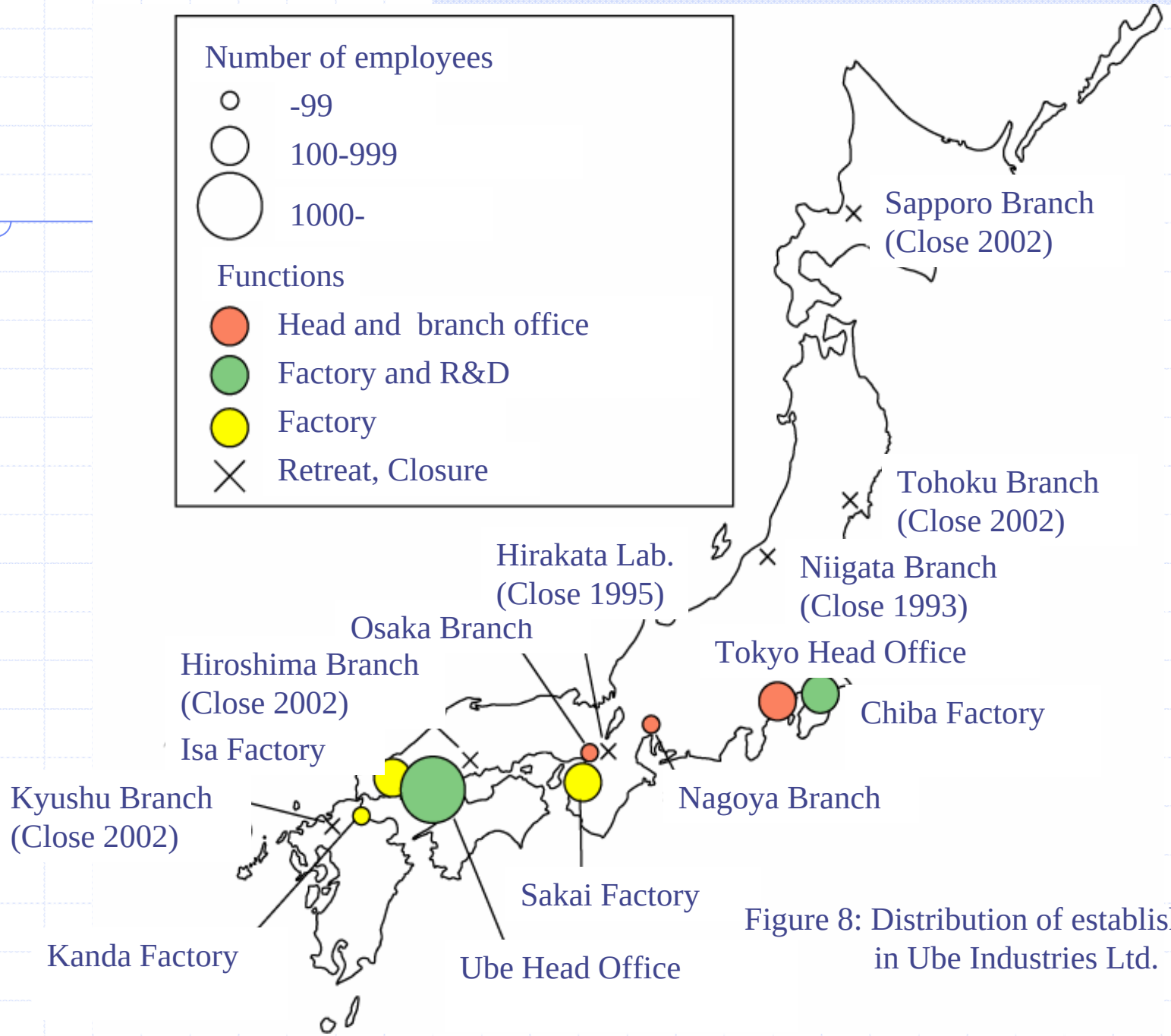


Figure 8: Distribution of establishments in Ube Industries Ltd.

2 Industry-Academy-Government Collaboration in Ube City

■ Pre History

①1938：Ube Higher Technical School（→Dept. of Technology Yamaguchi Univ.）
1944：Yamaguchi Prefectural Medical School（→MD. Yamaguchi Univ.）

②1950s：Anti-air pollution by Industry-Academy-Government collaboration
"Ube Model"

③1984-2000：Technopolis Project

■ Advance of Industry-Academy-Government Collaboration

1997：Study Group of Collaborative Research Center(CRC), Yamaguchi Univ.

1997：Chamber of Ube Industrial Vision (Supported by Chamber of Commerce)

2001："Tech & Business Collaborate(T&B)" Ube National College of Technology

2002：Speed networking event "C-UBE"

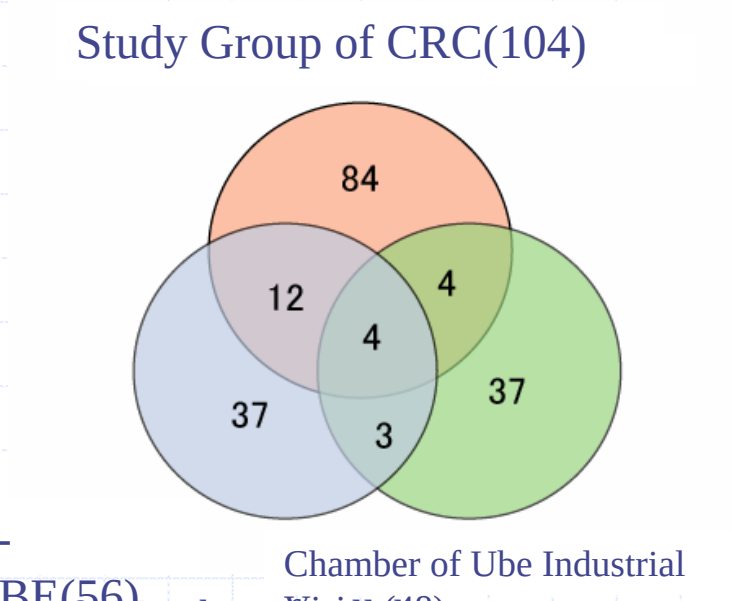


Figure 9. Number of collaborative companies

3 Development of collaboration around Yamaguchi University

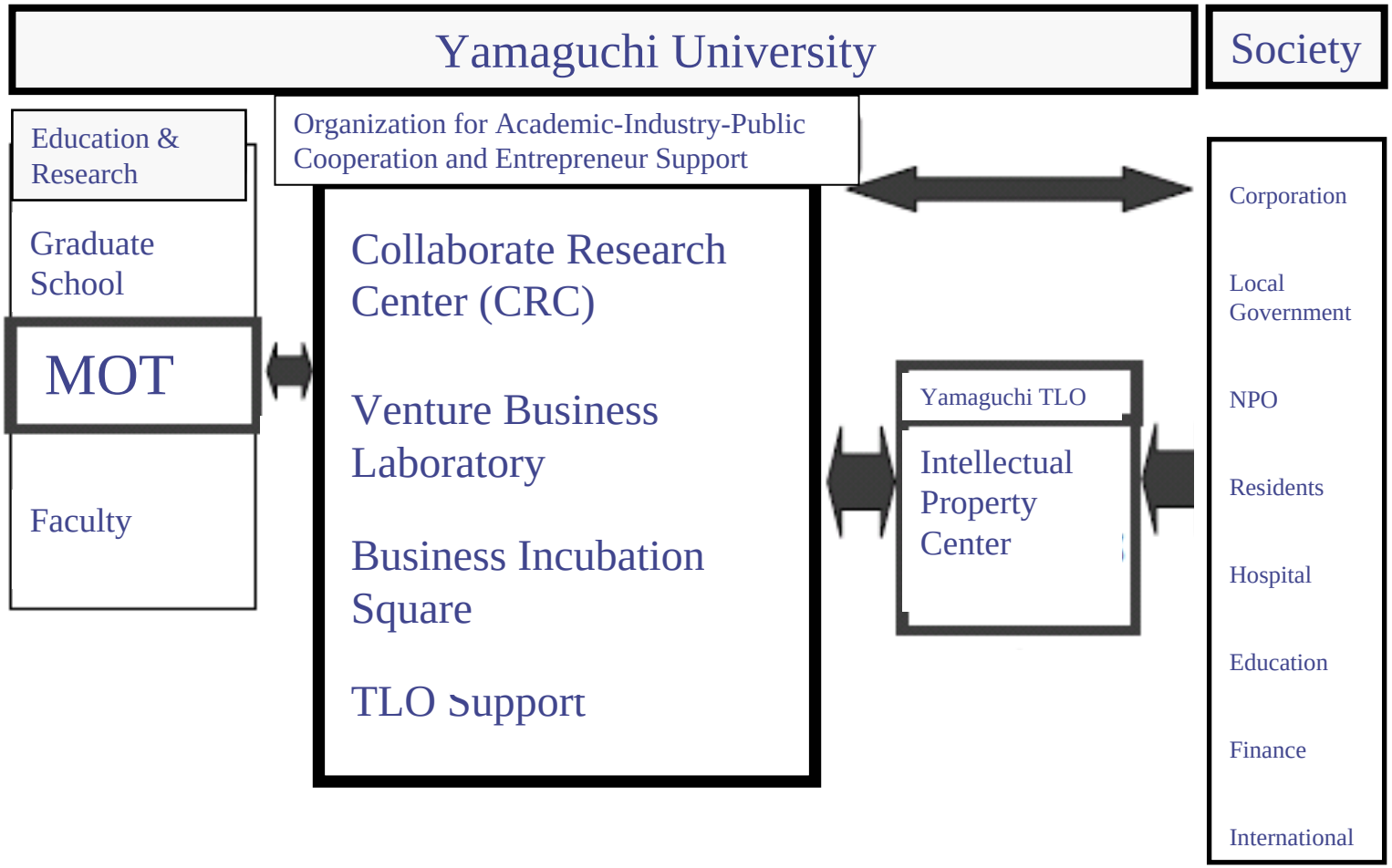


Figure 10 Collaborative organization of Yamaguchi University

Source: "Inter Lab" 08/2005

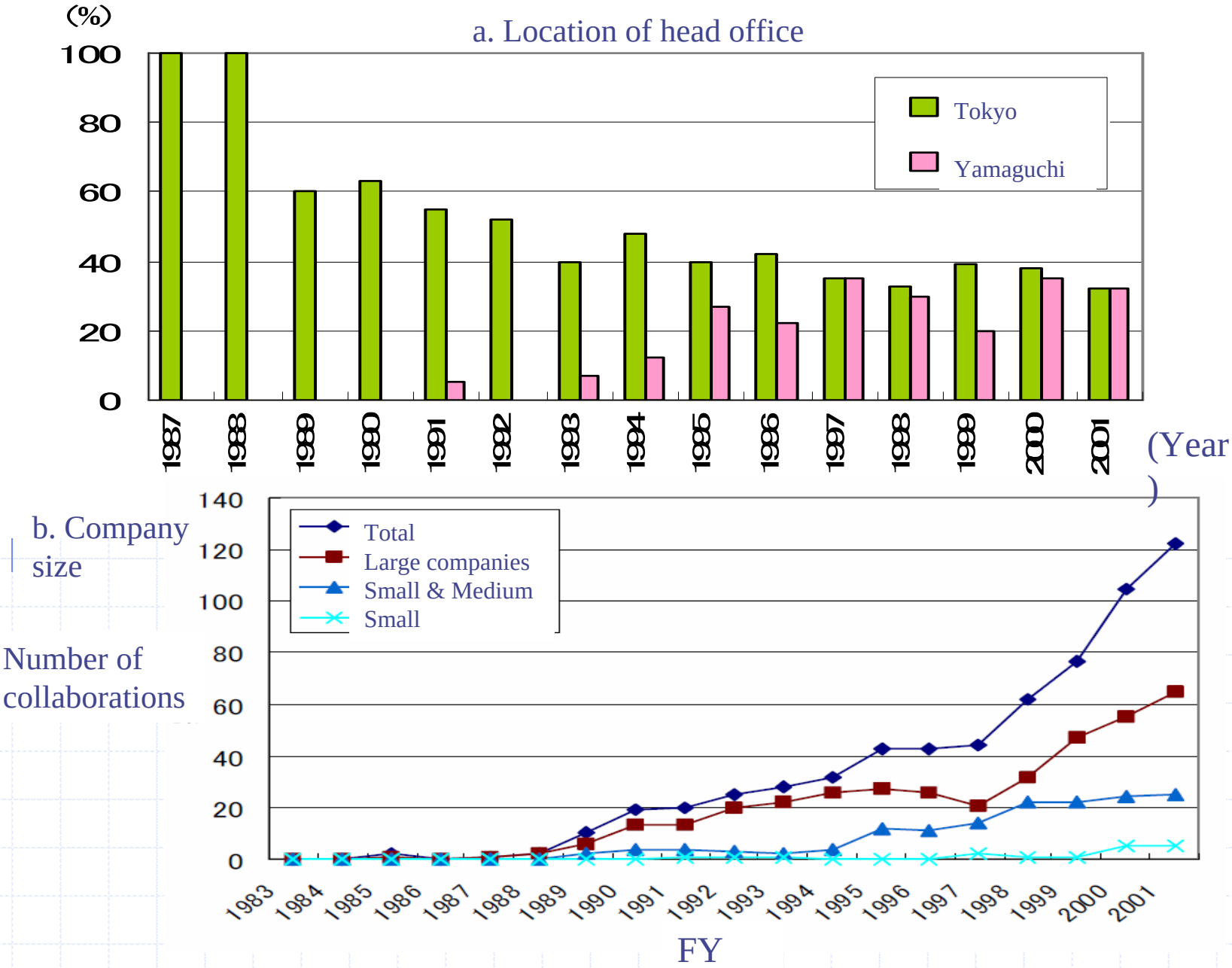


Figure 11: Characteristics of collaborative companies

Source：National Institute of Science and Technology Policy（2003）

4 Knowledge Cluster Initiative Project in Ube

Figure 12 Participating companies and academia

	Name	Place of Head Office	Capital (¥)	Employee Number
Industy	Aloka	Mitaka City, Tokyo	6.4billion	1,113
	NTT Advance Technology	Shinjuku City, Tokyo	5billion	1,539
	Toyobo	Osaka City, Osaka	43.3billion	3,183
	Hitachi Software Engineering	Shinagawa City, Tokyo	34.1billion	5,406
	Fujinon	Saitama City, Saitama	500million	1,237
	Matsushita Electric Works	Kadoma City, Osaka	138.3billion	13,991
	Daiyareddo	Chiyoda City, Tokyo	150million	20
	Yokogawa Electric Corp.	Mitaka City, Tokyo	32.3billion	5,112
	Wako Pure Chemical Industries	Osaka City, Osaka	2.3billion	1,400
	Almould	Ube City	40million	90
	UBE Indutrires	Ube City	48.5billion	3,361
	Ecomas	Ube City	3million	8
	Emtech	Ube City	10million	4
	Sanjo Seiki	Mine City	60million	170
	Sunyo HighTech	Ube City	10million	51
	Choshu Industry	Sanyo-Onoda City	360million	500
	Fujii Dengyosha	Ube City	30million	75
	Yuki Engineering	Shimonoseki City	15million	5
	Yoshimi Electronics	Shimonoseki City	10million	20
Academic Institution	MD, Yamagichi Univ.	Ube City		
	Dept. of Technology Yamaguchi Univ.	Ube City		
	Dept. of Science Yamaguchi Univ.	Yamaguchi City		
	Applied Medical Engineering Science Yamaguchi Univ.	Ube City		
	Yamaguchi Univ. Others	Yamaguchi City		
	Dept. of Technology Nagoya Univ.	Nagoya City, Aichi		
Public Institution	National Institute of Advanced Industrial Science and Technology			

5 Changing organizational relationships in Ube

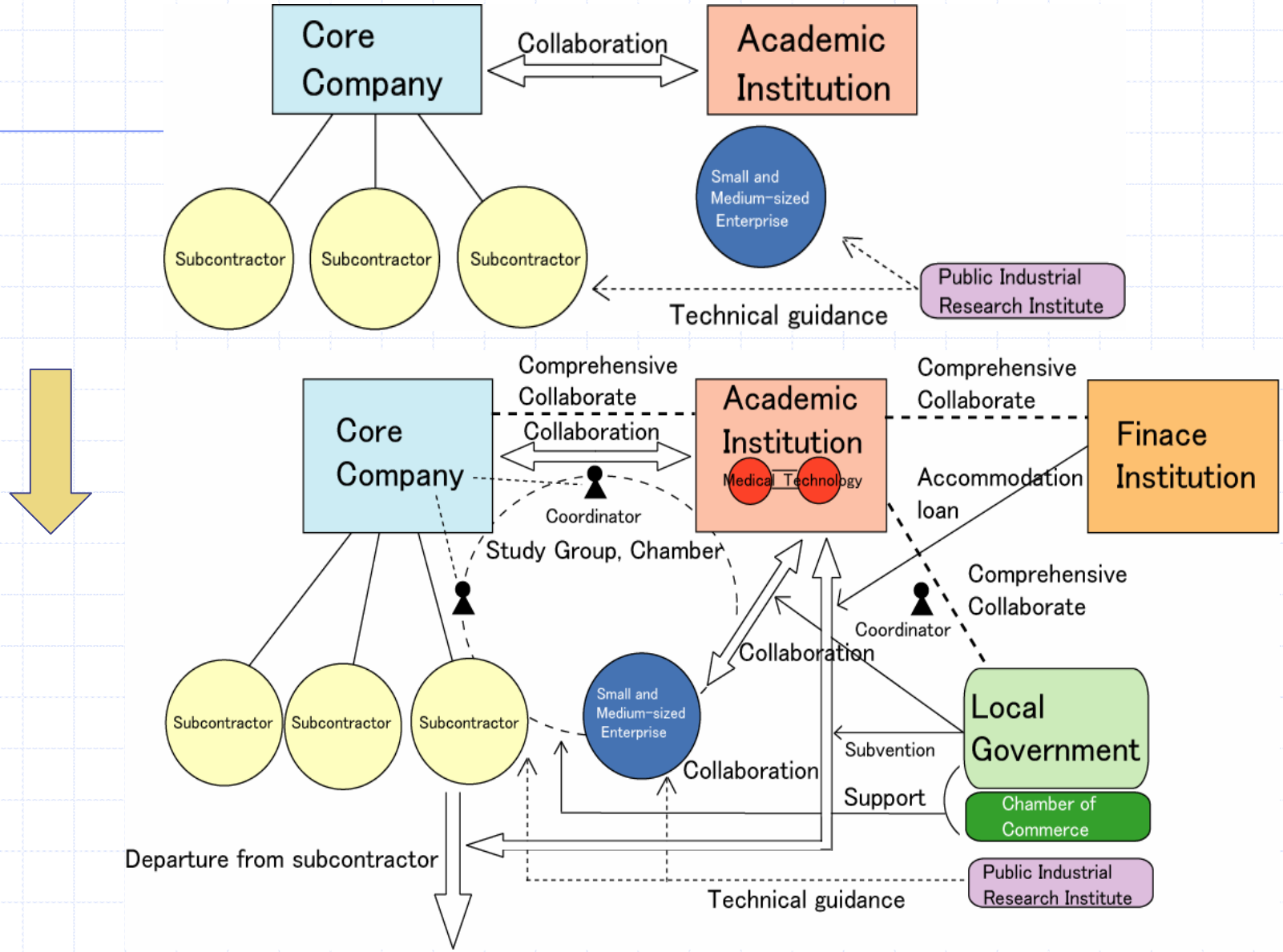


Figure 13 Changing relationships among actors in Ube

Ⅳ Concluding remarks

- Case Study implications

①Significance of regional history, culture and society

②Adjustment between global location strategy of core company and regional innovation system

③Changing relationships between actors (from subcontract system to industry-academy-government collaboration)

④Gap of innovation seeds between core company and university

⑤Revitalizing central urban areas and urban space renovation

⑥Fostering human resources and recruiting personnel for R&D

⑦Reconsideration on objectives: global competitiveness or revitalization of local economy

Changes in Regional Economic and Industrial Policy

- Retreat from promoting decentralization
  - ・Industrial Relocation Promotion Law (1972)→（repealed in 2006)
  - ・High-tech Industrial Zone Promotion Act (1983)→(repealed in 1999)
  - ・Knowledge-intensive Industry Location Act (1988) →（repealed in 1999)

- Supporting development of regional competitive industries and enterprises
  - ・ Industrial Cluster Program (since 2001)
  - ・ Small and Midium Enterprises' New Business Activity Promotion Law(2005)
  - ・ The Law Concerning Establishing Regional Industrial Clusters (since 2007)

- Regional innovation policy
  - ・ Industrial Cluster Policy（Ministry of Economy, Trade and Industry）
  - ・ Knowledge Cluster Policy（Ministry of Education, Culture, Sports, Science and Technology）

Research issues and method

- Intensive empirical survey on regional innovation systems

- Typical research area
  Metropolitan area: Kyoto
  Local city : Hamamatsu, Yonezawa
  Company town: Hitachi, Ube
  Planned R&D city : Tsukuba

- Strengthen quantitative and qualitative assessment methods considering experiences in EU regions

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