TAMA - An Initiative toward An Innovative Cluster in Japan -

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RIETI

Contents of Presentation

1. Kodama

(1) Background

(2) Results of questionnaire survey

2. Mr. Okazaki

(1) TAMA Association

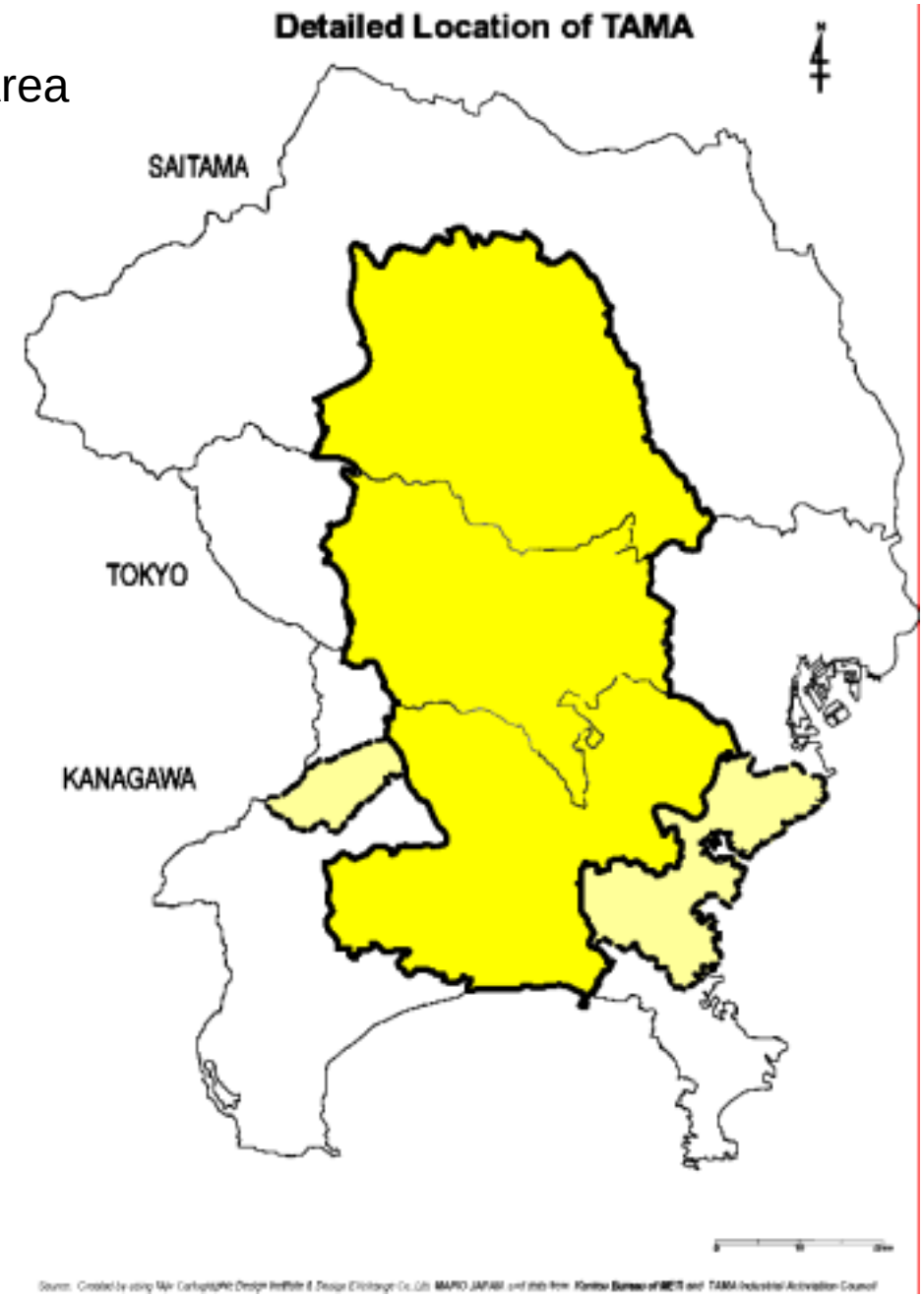
(2) TAMA Association’s activities in detail

Location of TAMA in Japan

(Source) Nijix Cartographic Design Institute & Design EXchange Co.,Ltd. ***MAPIO JAPAN***.

TAMA:

Technology Advanced Metropolitan Area



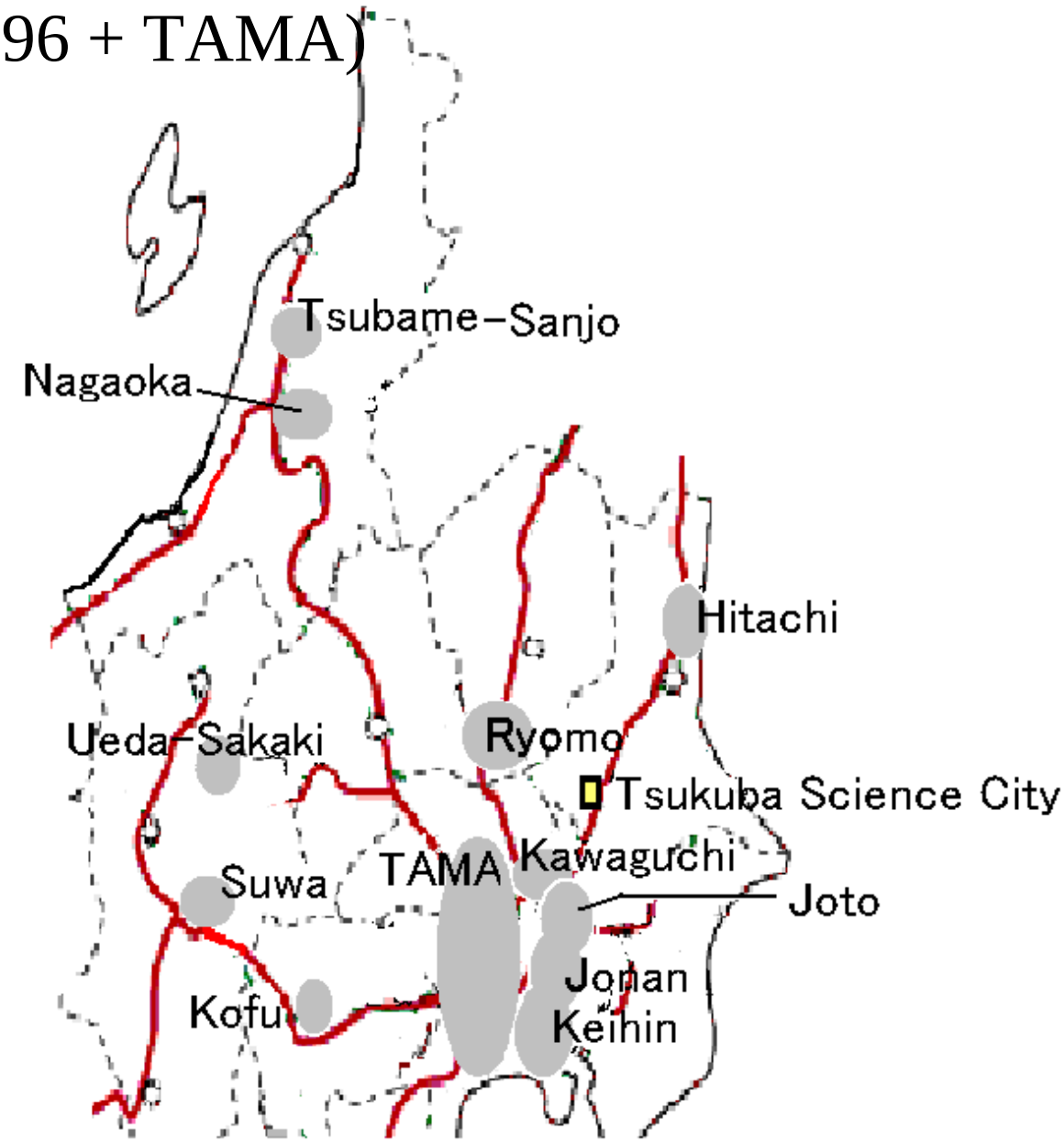
History of the Region as an Agglomeration

- Before WWII
  - Start from a major textile producing district
  - Evacuation of major factories from central Tokyo and Keihin Bay Area
- Postwar reconstruction period
  - Conversion from military production to non-military uses
- High growth period and thereafter
  - Relocation from the center of Tokyo and Keihin Bay Area
    - Large factories
    - Universities and colleges
  - Establishments of new SMEs

Inauguration process of TAMA Association - Start of Cluster Formation -

- Study on Greater Tama Region by Kanto Regional Bureau of MITI
  - Conducted in FY1996, published in June, 1997
- Preparatory committee
  - Started in September, 1997
- TAMA Industrial Vitalization Council
  - Established in April, 1998
- TAMA-TLO
  - Established in July, 2000
- TAMA Industrial Vitalization Association Inc.
  - Reorganized in April, 2001

Major Industrial Agglomeration in the Greater Kanto Region (as recognized in 1996 + TAMA)



Change of Highlighted Function of Industrial Agglomerations

- Before TAMA
  - Increase of efficiency in production by agglomeration of producers and formation of production network
- Since TAMA
  - Creation of new technologies, new products and new businesses by combination of different technologies and knowledge

Economic Components of TAMA

1. R&D units of large enterprises
   - E.g. NEC, Hitachi, Toshiba,Yokogawa, Fuji Electric
2. Universities and colleges that have scientific or engineering departments
3. Product developing SMEs
4. Product processing SMEs

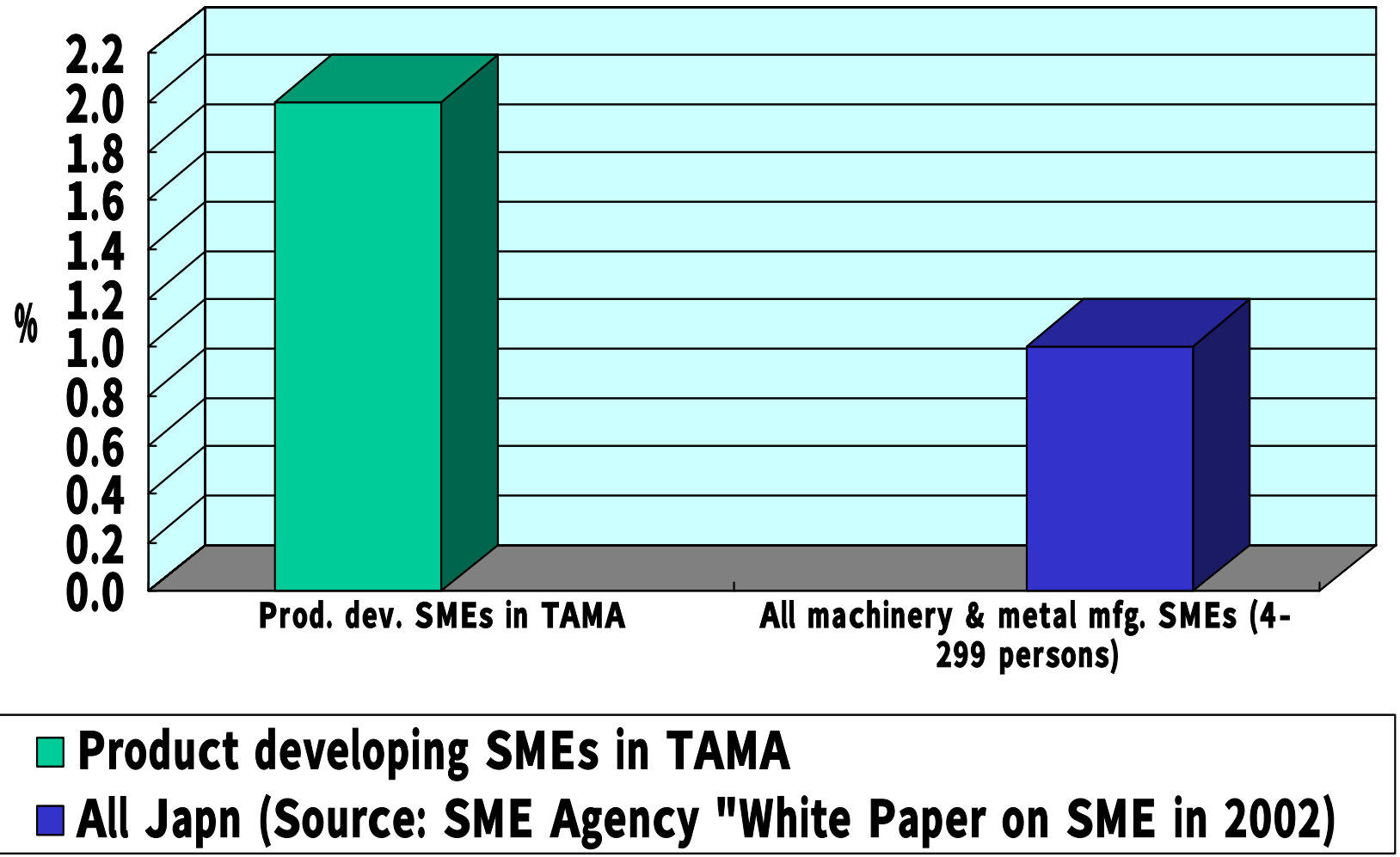
Product Developing SMEs

- Product developing SMEs
  - Definition: SMEs that have designing capabilities and have their own products.
  - They have planning and developing capability backed up by a grip on market needs
- Product processing SMEs
  - Definition: SMEs that are engaged in parts processing, such as cutting/grinding/sanding, casting/forging, pressing, coating/surface treatment, component assembly, and metal molding.

Number of Respondents for 2003 Questionnaire Survey

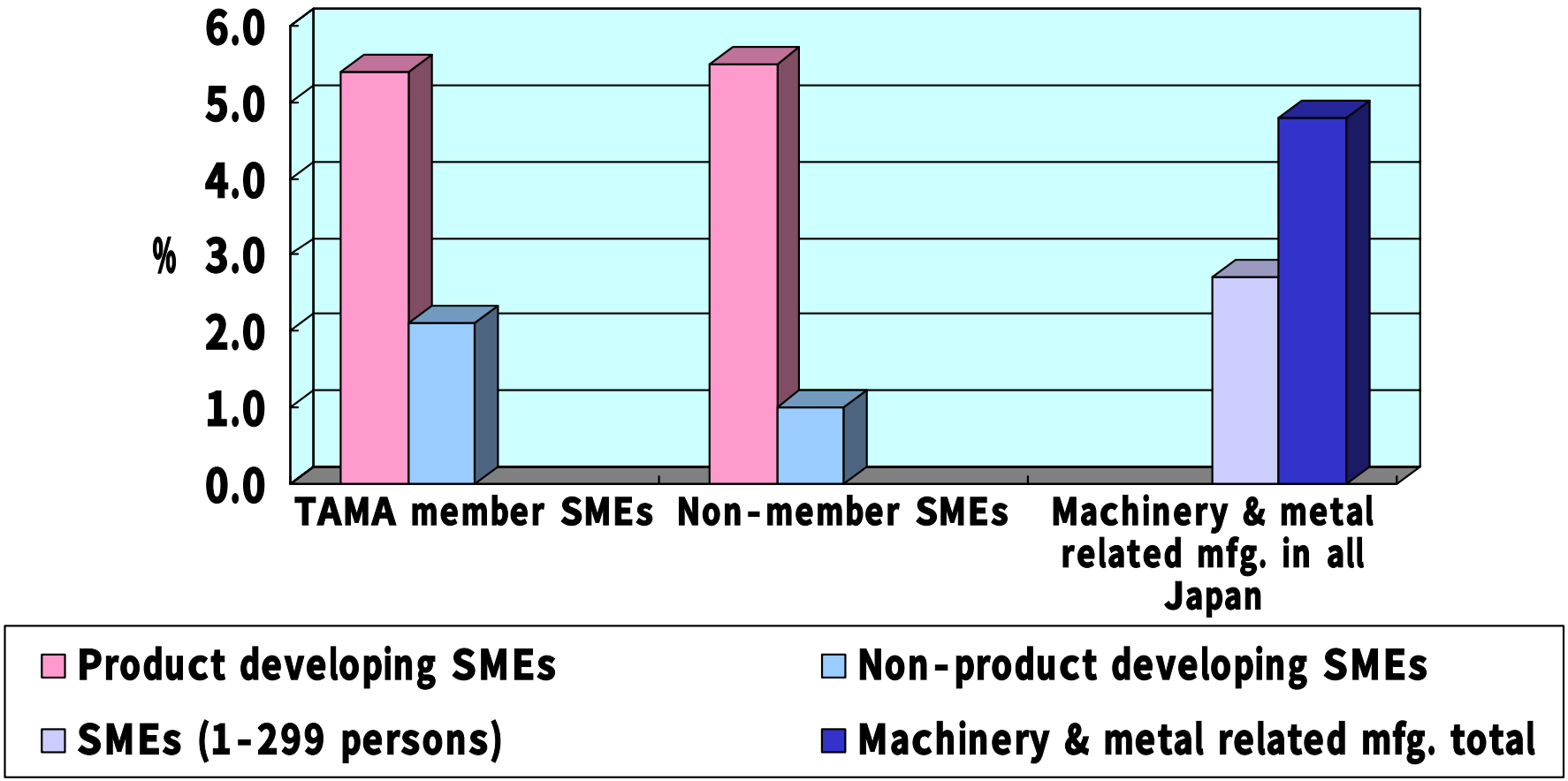
	Total	TAMA members	Non-members
All respondent firms	214	120	94
SMEs	200	114	86
Machinery & metal related manufacturing	158	81	77
Other manufacturing	6	5	1
Information services	18	12	6
Other non-manufacturing	18	16	2
Middle-sized firms	6	3	3
Large firms	5	3	2
Unclassified	3	0	3

Current Profit Ratio to Sales (FY2001)
Product developing SMEs
(machinery & metal related manufacturing)



R&D Expenditure Ratio to Sales (FY2001)

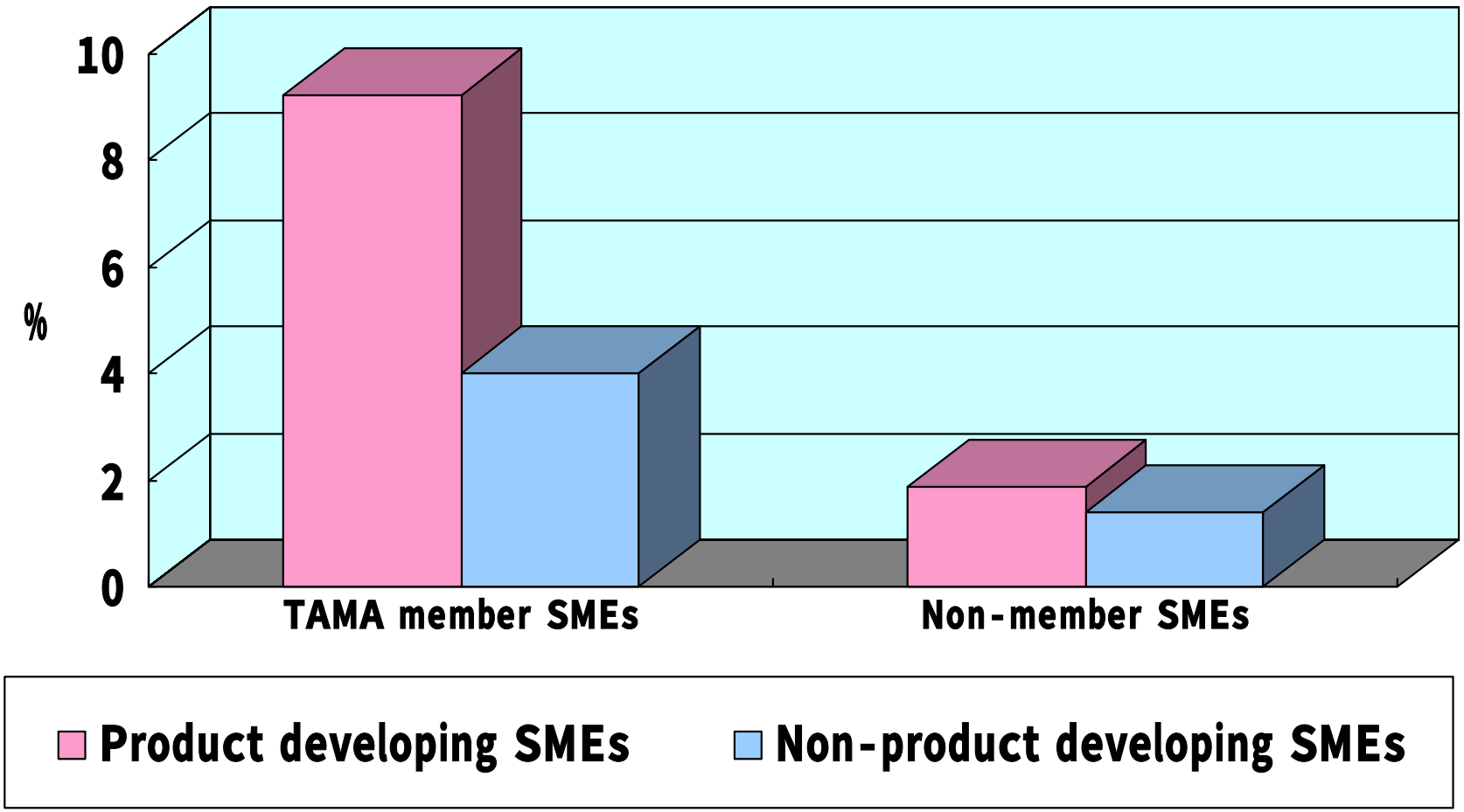
(Machinery & metal related manufacturing)



(Source) All Japan: Figures for the firms conducting research by Ministry of Public Management etc. “Survey of Research and Development”

(Note) Simple average for TAMA SMEs. Weighted average for all Japan firms.

Trends in R&D Expenditure (FY2001/FY1999)
(Machinery & metal related manufacturing)

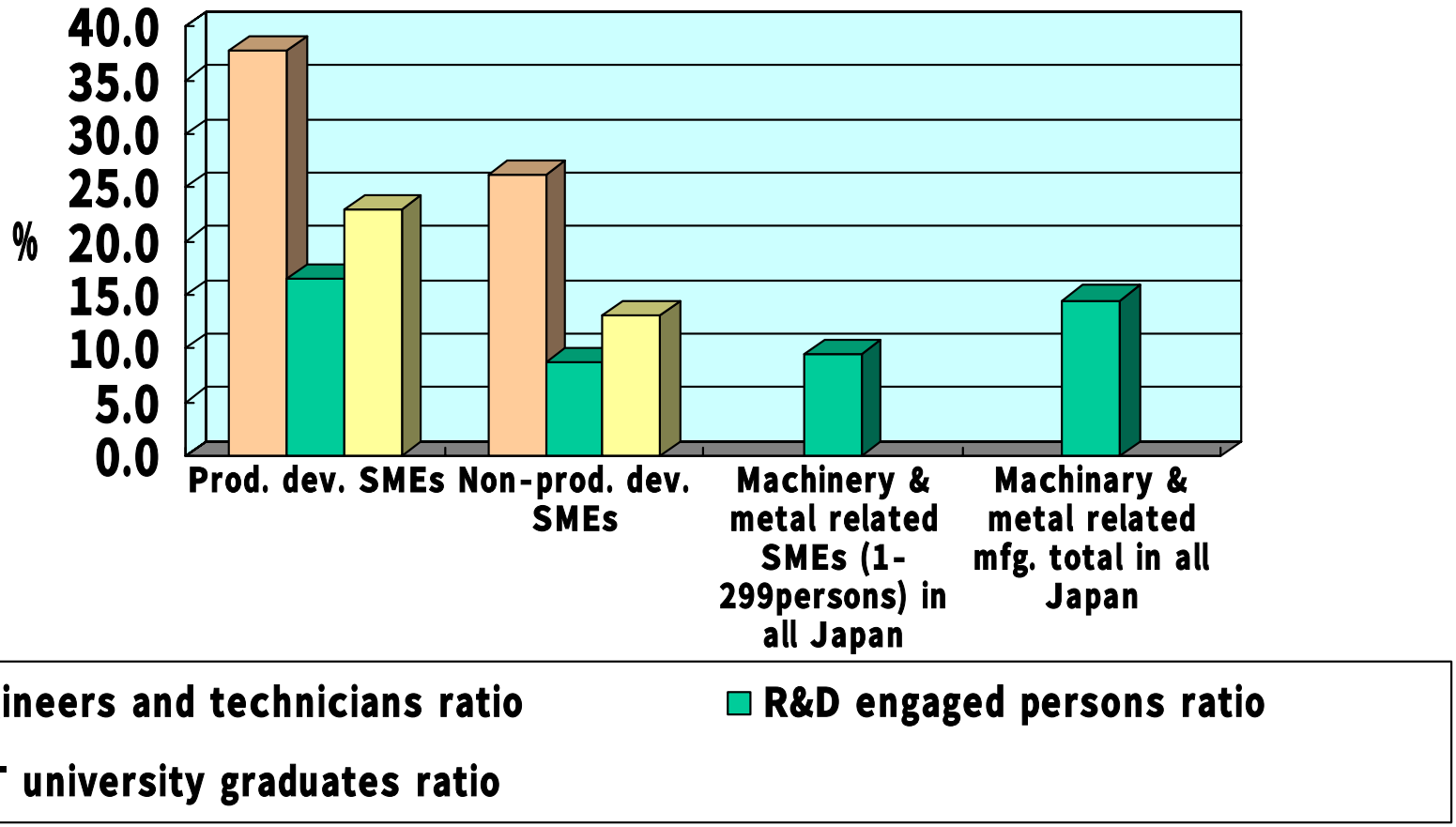


(Note) Simple average of answers selecting options of each five % point between -20% and +20%, below -20% and over +20%.

S&T Human Resources of TAMA Member SMEs

Ratio to permanent workers (end of FY2001)

(Machinery & metal related manufacturing)

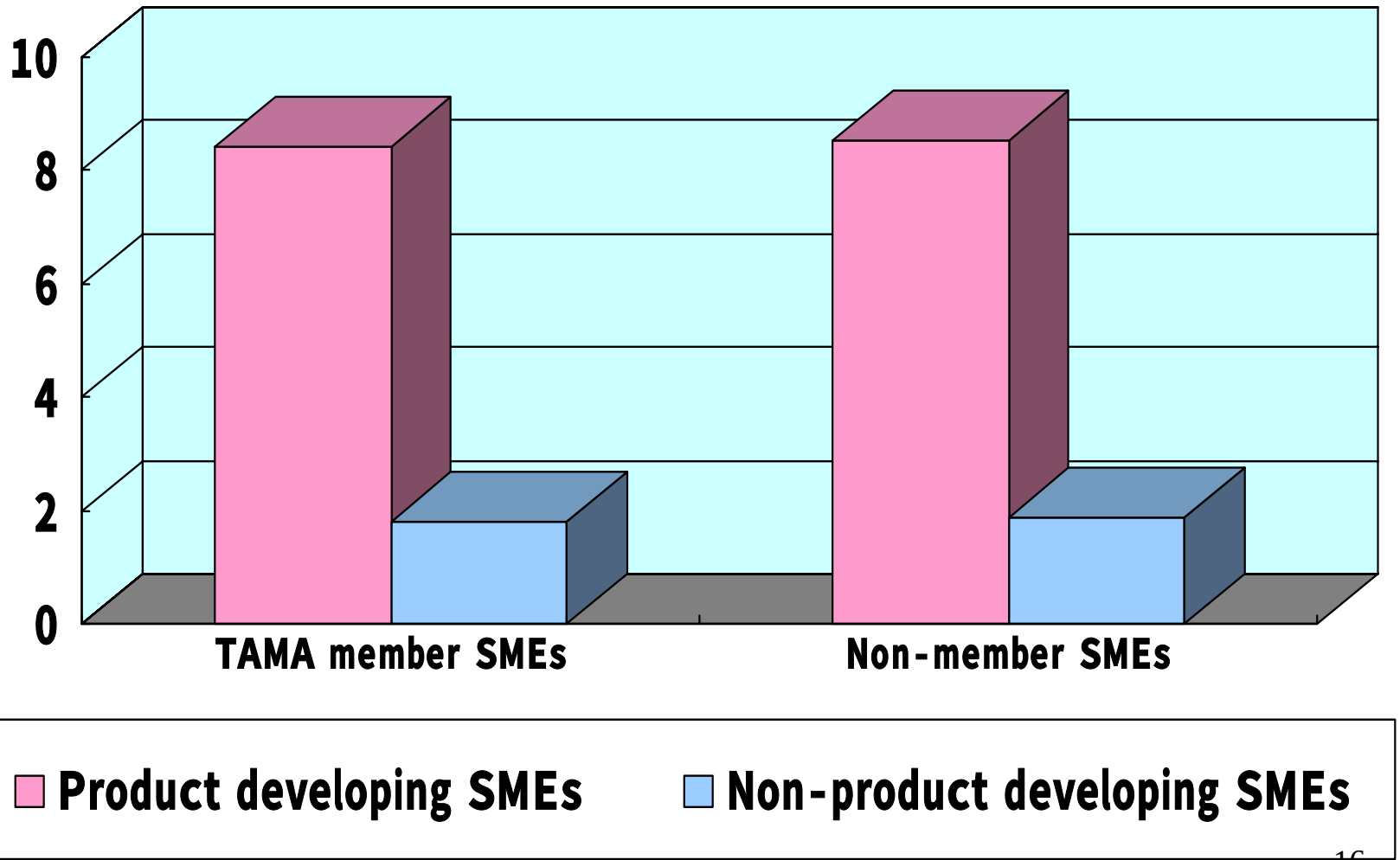


(Source) All Japan: Figures for the firms conducting research by Ministry of Public Management etc. “Survey of Research and Development”

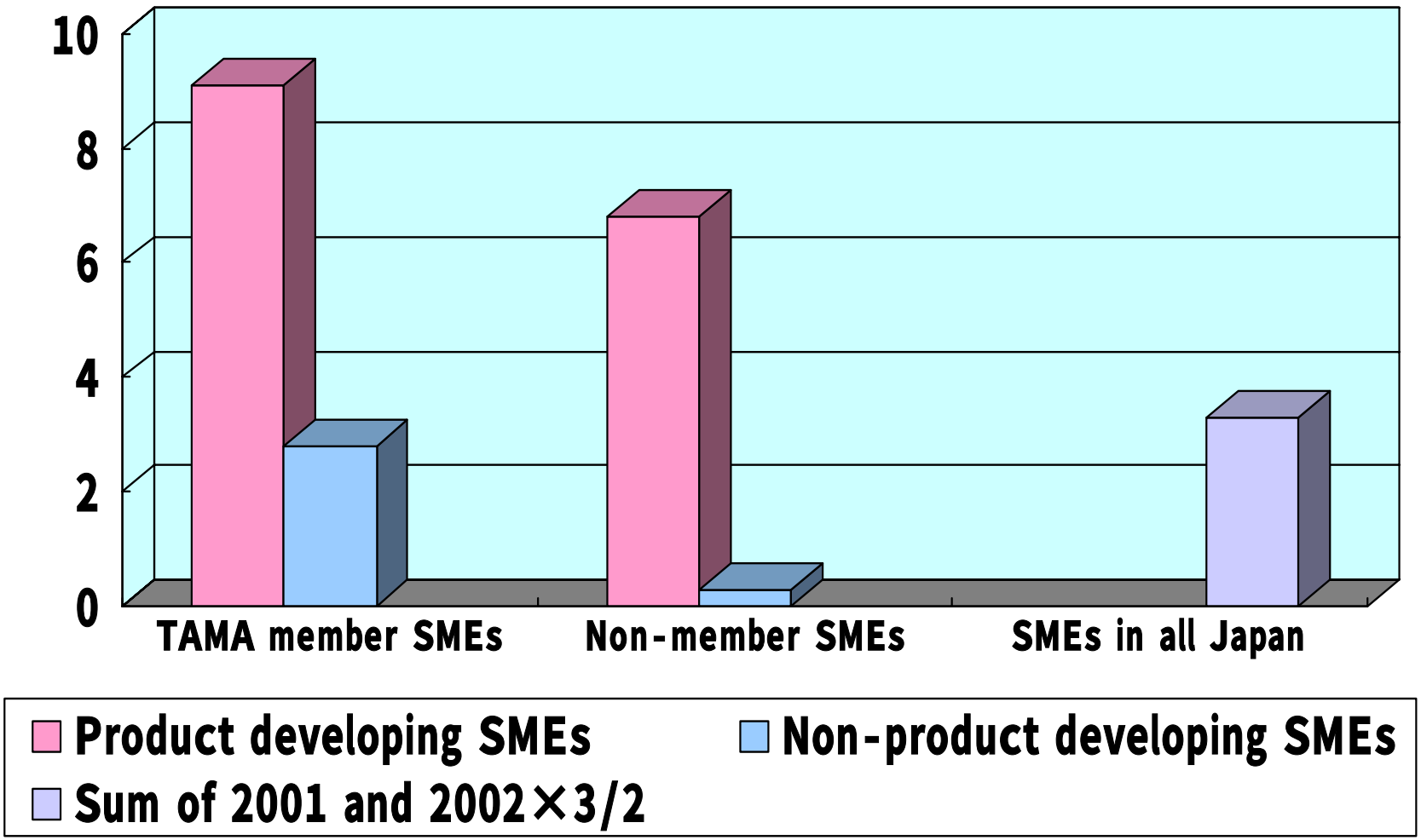
(Note) Simple average for TAMA SMEs. Weighted average for all Japan firms.

Number of Valid Patents

(Machinery & metal related manufacturing)



Number of Applications for Patent in the Recent 3 Years
(Machinery & metal related manufacturing)

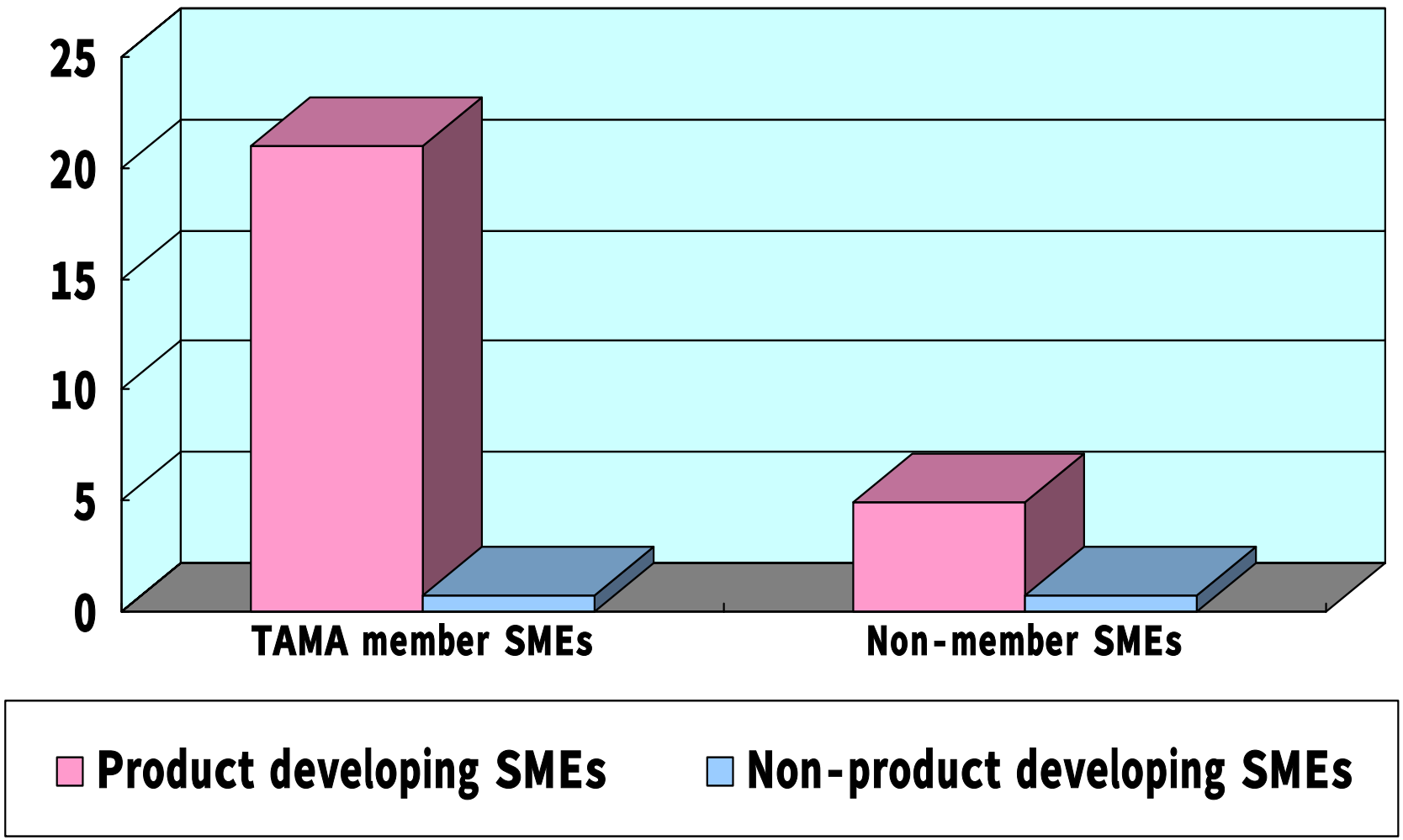


(Source) All Japan: Figures for the firms which experienced application for patents in 2000 by Japan Patent Office “Survey of Activities on Intellectual Property”.

Number of New Products

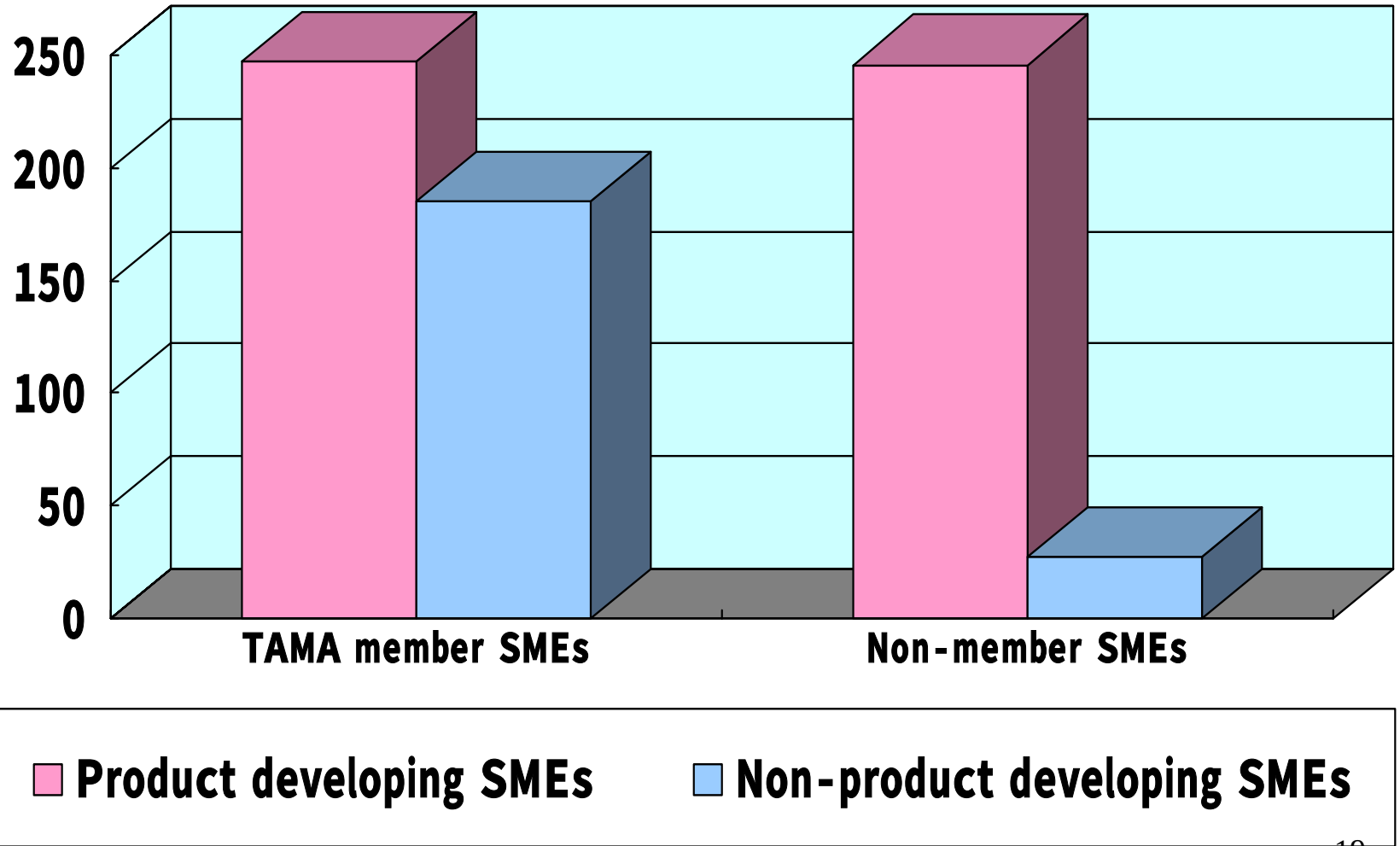
Put on Sale in the Recent 3 Years

(Machinery & metal related manufacturing)

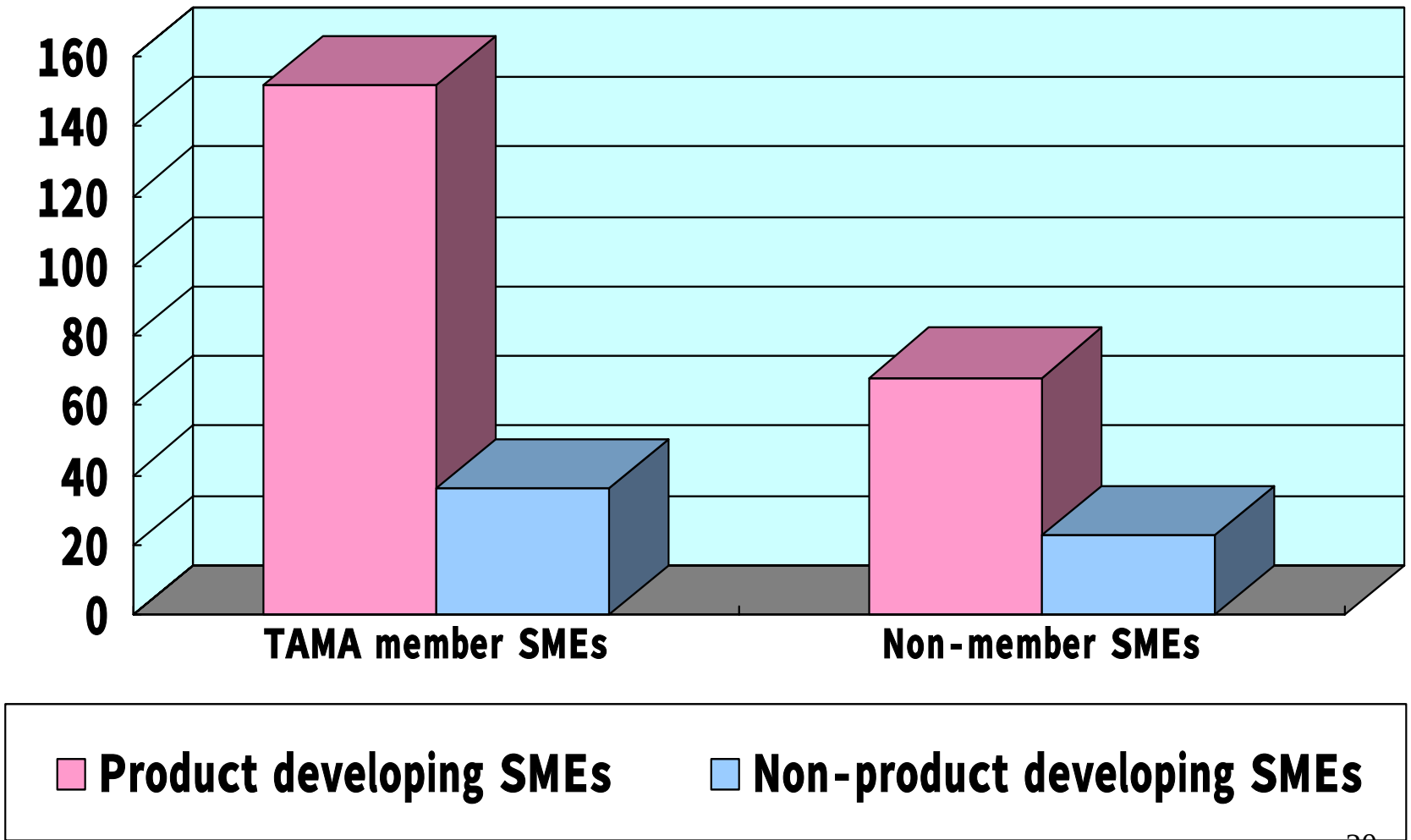


Number of Customers

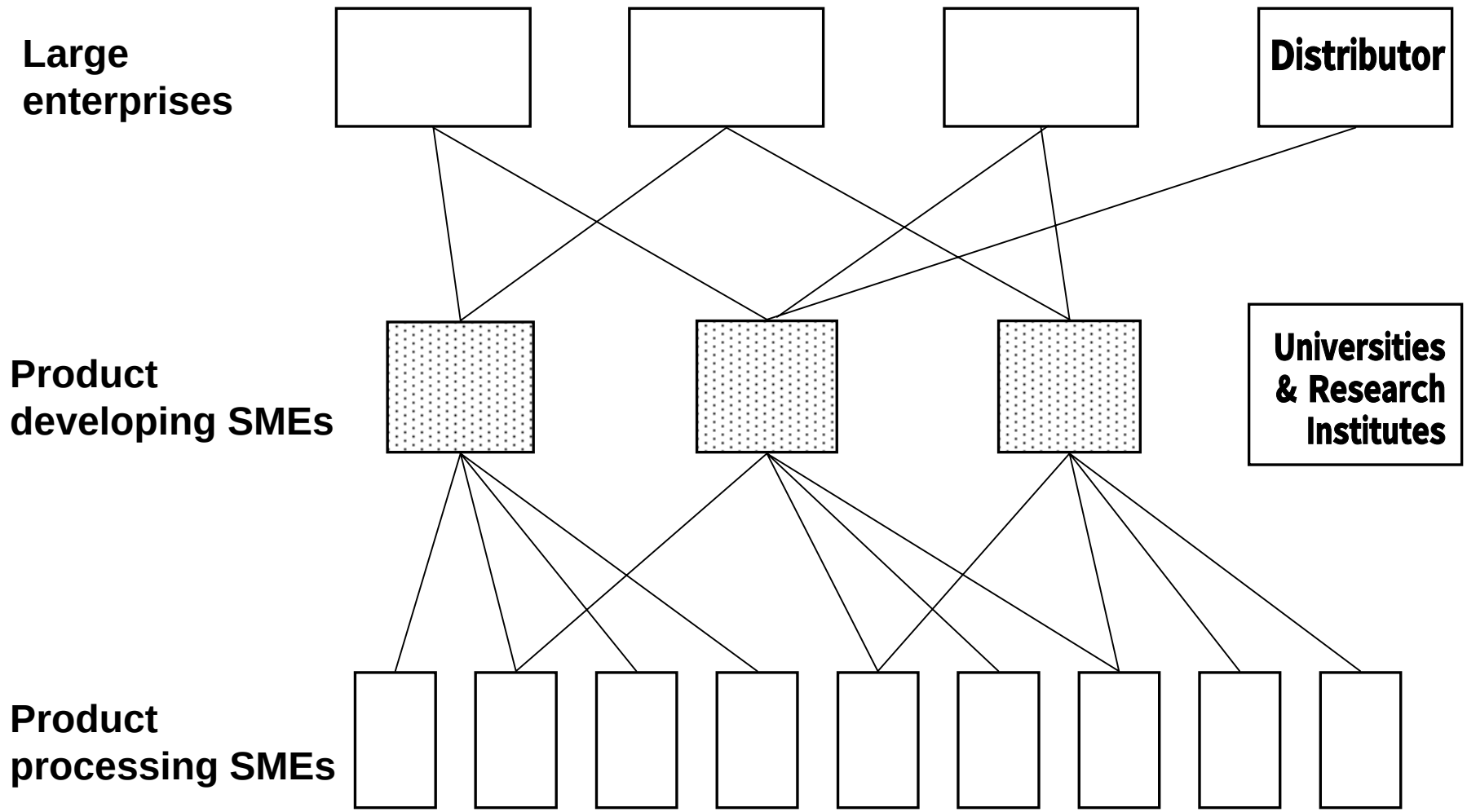
(Machinery & metal related manufacturing)



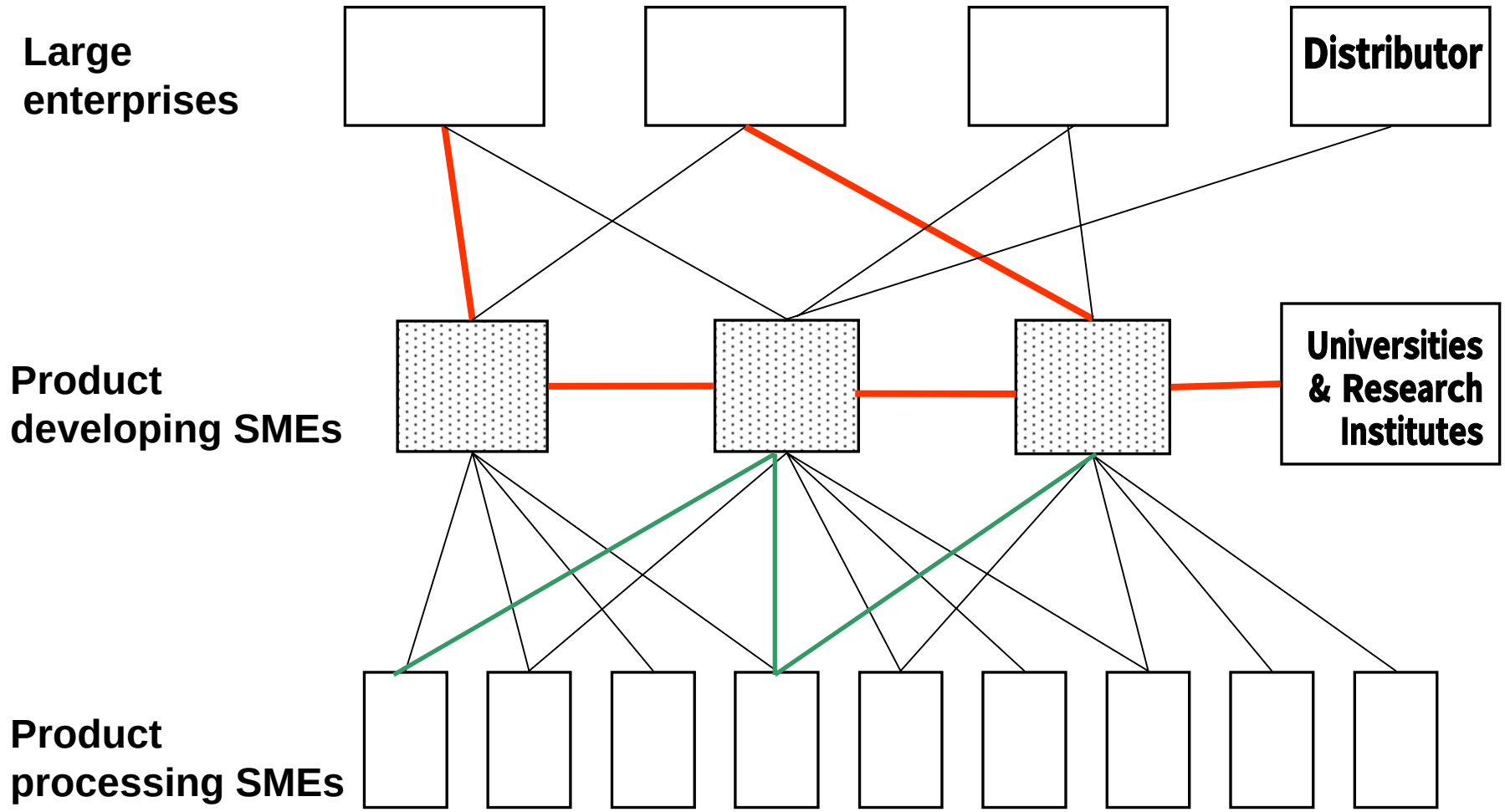
Number of Suppliers
(Machinery & metal related manufacturing)



Network among Firms
BEFORE TAMA Establishment



Network among Firms
AFTER TAMA Establishment



Examples of Product Developing SMEs

Elionix Co., Ltd.	High Precision Electron Beam Lithography System
	Electron Probe Surface Roughness Analyzer
Crestec Corporation	High Resolution Electron Beam Lithography System
ECG Kokusai Co., Ltd.	Impulse Winding Tester
Faber Co., Ltd.	High-frequency Magnetic Material Measurement System
Shinwa Co., Ltd.	Photo Mask (for IC and printed-circuit board manufacturing)
	R&D Contracting
Process Lab. Micron Co., Ltd.	Metal Mask (for soldering devices to printed-circuit boards)
	Bump Mask (for soldering IC chips to IC packages)
Stack Electronics Co., Ltd.	Transmission Components & Equipment for Radio Frequency, Micro Wave and Optical Signals

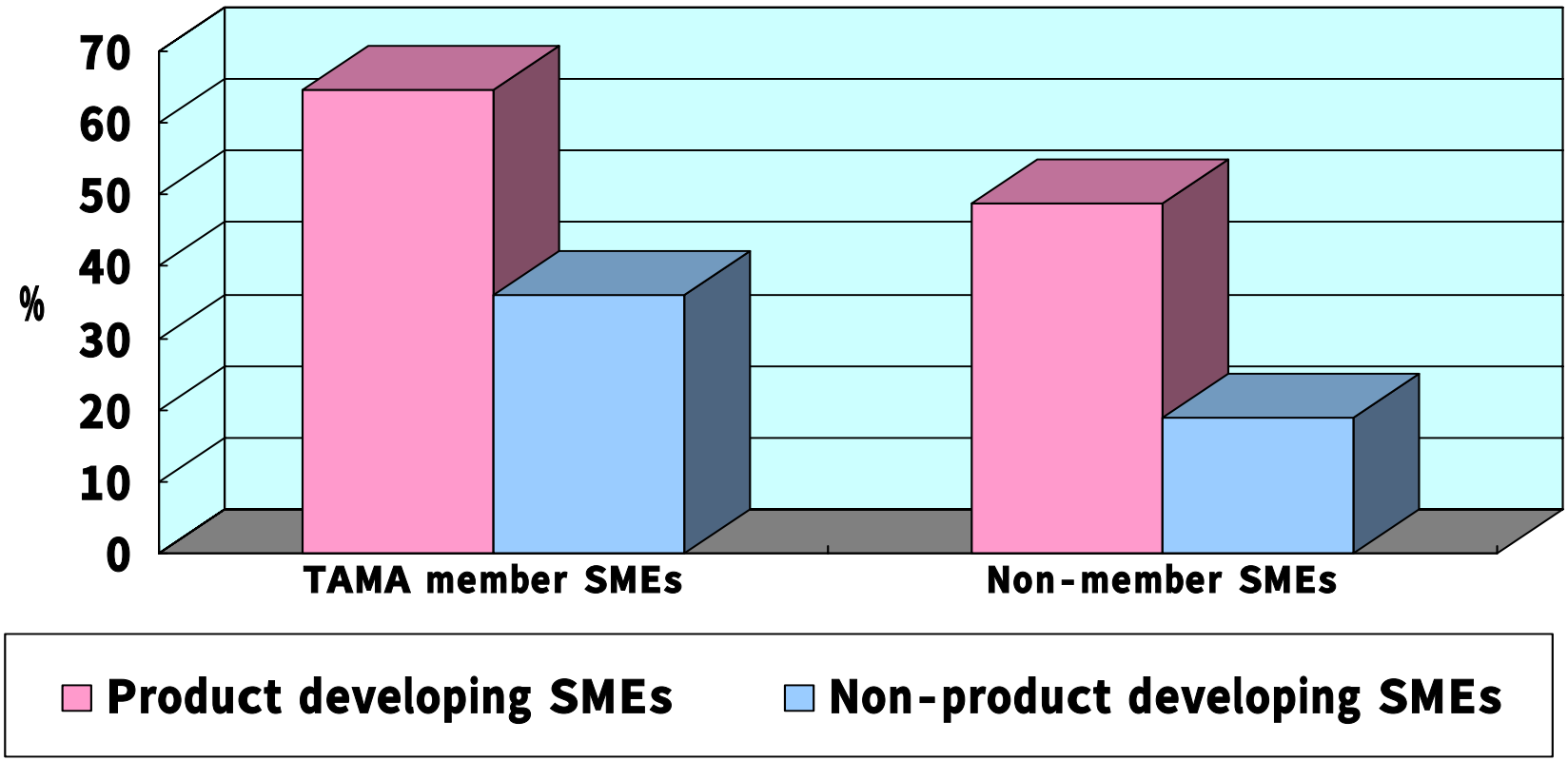
Origins of Product Developing SMEs in TAMA (Machinery & metal related manufacturing)

Spinning off from an existing firm	57.3%
Start-up with keeping relationship with an existing firm	10.7%
Setting up an affiliated company by an existing firm	5.8%
Start-up by university researchers	2.9%
Start-up without experience in existing firms	23.3%

(Note) Number of respondents is 103.

Firms Ratio with Cooperation with Universities

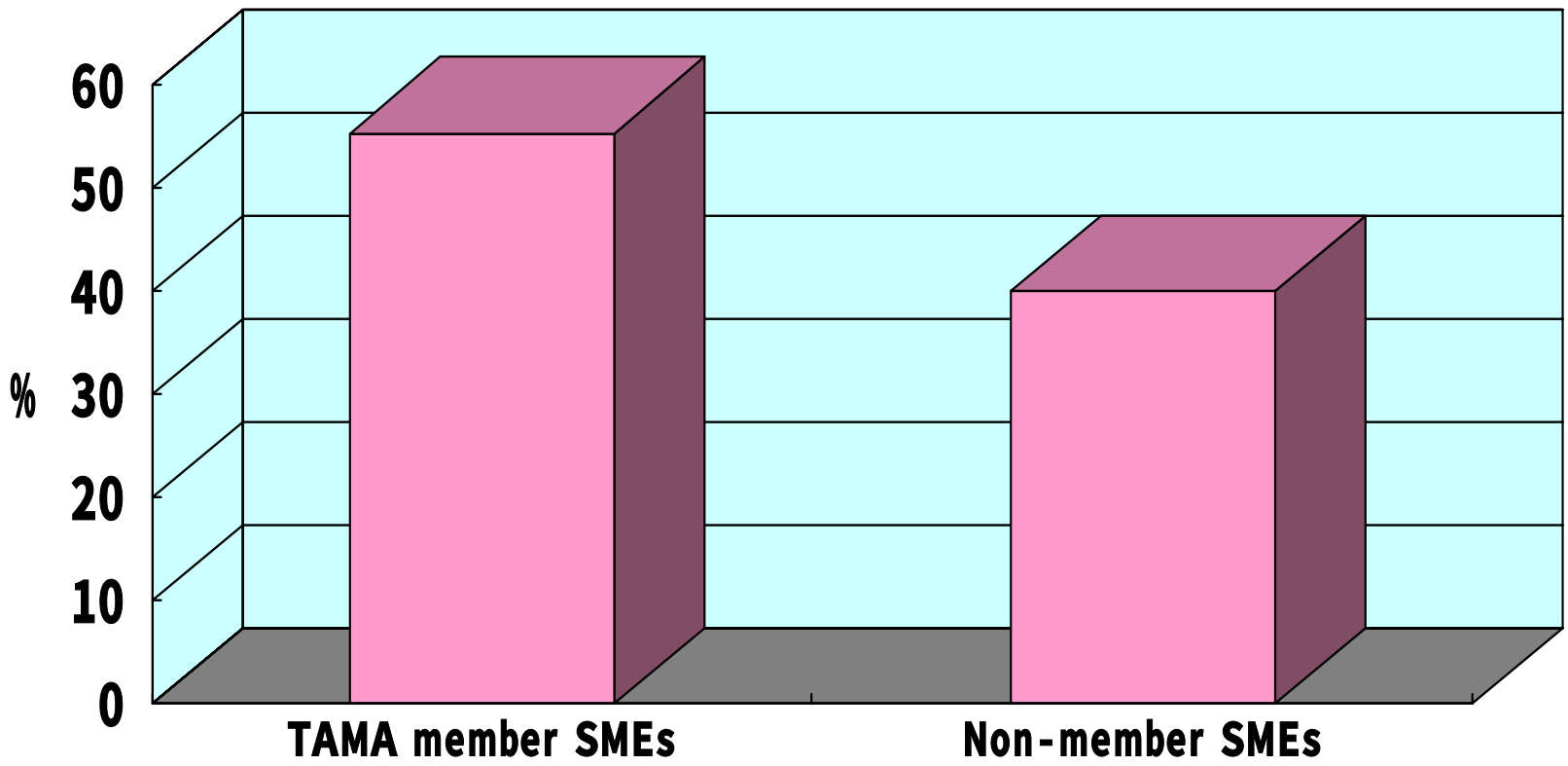
(Machinery & metal related manufacturing)



(Note) Universities here include national or public research institutes.

Easiness of Cooperation with Universities Compared to 5 Years ago

(Product developing SMEs in machinery & metal related manufacturing)



Firms Ratio with Cases Support Agencies Contributed (%)

			With cases agency contributed			No cases agency contributed
				TAMA Association	Other agencies	
Machinery & metal related mfg. SMEs	Product developing	TAMA member	42.6	35.2	13.0	53.7
		Non-member	30.2			69.8
	Non-product developing	TAMA member	36.4	27.3	9.1	63.6
		Non-member	8.7			91.3
Information service SMEs		TAMA member	50.0	41.7	8.3	50.0
		Non-member	16.7			83.3

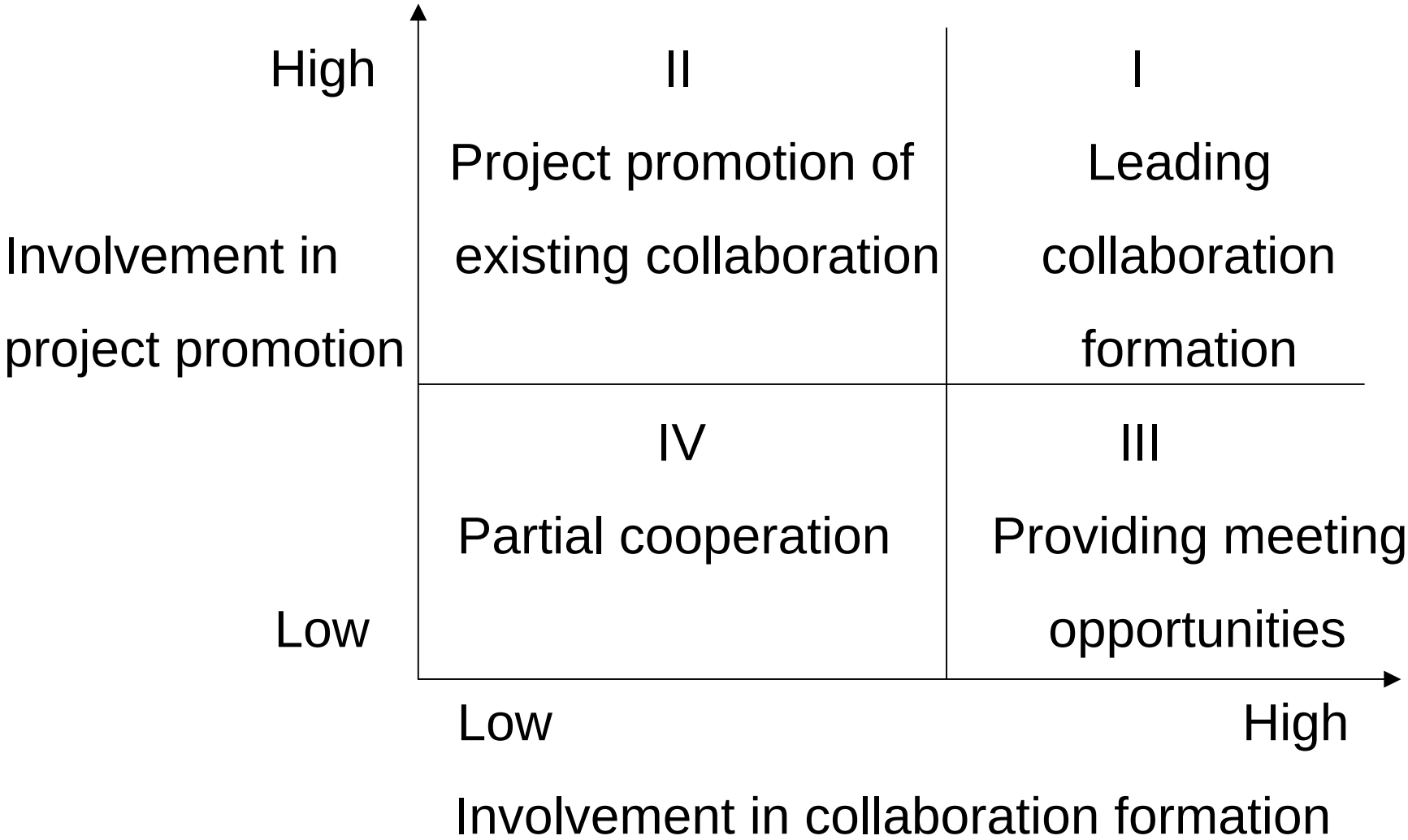
(Note) Firms ratio with technology or product development cases or cooperation for such development for which any support agency contributed.

Classification of Surveyed Collaboration Cases (active cases only)

as of March, 2002

	Commercialized	Development-in-progress	Total
Member cases	14	26	40
Association supported cases	6	17	23
Realized through Association	6	14	20
I Leading collaboration	1	7	8
II Project promotion of existing collaboration	4	1	5
III Providing meeting opportunity	1	6	7
IV Partial cooperation	0	3	3
Noninvolvement cases	8	9	17
Non-member cases	1	4	5
Total	15	30	45

Types of Collaboration Intermediary Function by TAMA Association



Combination of technological seeds in Association-led collaboration cases

	Theme of product/technology	Core firm	Universities & other research institutes		Other firms	
	IMI consortium project					
1	High-density LSI wafer probe card	IC/LSI probe cards	Micro-machining	Electric contact formation	Precise prototype processing	
2	Microfabricated chlorine gas sensor	Chemical substance sensor	Micro-machining	Advanced sensor processing	Precise prototype processing	
3	Miniaturization of wireless probes for electronical measuring instruments	Probes for electronic measuring, high frequency wave transmission unit	Micro-machining	Demagnifying of communication circuits	Precise prototype processing	
4	Decentralized power conditioner for photovoltaic power generation system					
	Controller module	Digital control devices	Photovoltaic power generation algorithm			
	Inverter module	Power supply equipment	Micro-inverter advanced digital circuits designing	Micro-device designing		
5	BioMEMS dioxin gauge system	Chemical substance sensor	Micro-machining	Dioxin analytical method	High-performance reagent	Ultra-precise prototype processing
6	Simple XML-EDI system	Productivity management know-how in auto parts manufacturing	PSLX interface		Productivity information system	Communication modules
7	Hydrograph gauge and constituent gauge based on hetero-core optical fiber sensor	Optical fiber, optical measuring device	Hetero-core optical fiber sensor (including processing of micro-device)		Environmental monitoring system	
8	*Sagami mulberry tea* and its related products	Agri-business planning ability	Knowledge of mulberry leave effect-efficacy	Capacity to analyze physical characteristics & chemical constituents		

Perspective toward an Innovative Cluster

- There are a number of innovative firms.
  - Product developing SMEs, esp. TAMA members, show high scores in relevant indicators.
  - TAMA member product processing SMEs are R&D oriented.
- Cluster formation is progressing
  - TAMA member firms are aggressive in collaboration with universities.
  - Outcomes of TAMA Association activities are confirmed.

Characteristics of TAMA-type Cluster Initiative

- Formation of intermediary organization
  - TAMA Association
- Product developing SMEs
  - Spin-off start-ups are expected as their origins.
- Universities and other research institutions
  - Source of technology seeds and human resources
- Product processing SMEs
  - Production basis for product developing SMEs
- Large firms
  - Expected to get involved for boosting the cluster function

Regional / Private Initiative and Government Role

- Regional players take initiatives.
  - Membership organization
  - Persons taking leadership in each level
  - Contribution of municipalities to the executive office
  - Autonomous development of individual projects
- Government as a supporter is also important.
  - Supporting framework formation including concept sharing
  - Intermediary function from a broader view point
  - Financial support to encourage regional and private initiatives

Notes and Sources

2003 Questionnaire Survey of TAMA

- Conducted in March, 2003
- Survey objects
  - TAMA member firms 120 from 262 (45.8%)
  - Non-member firms 94 from 1364 (6.9%)
    - Machinery & metal related manufacturing industry
    - Information service industry
      - in TAMA region
- Commission to TAMA Association
  - Dispatch and collection of the survey sheets
  - Primary aggregation

Definition of SME in the 2003 Questionnaire Survey

- SME: Firms with capital of 300 million yen or less or workforce of 300 or less (Firms with capital of 50 million yen or workforce of 100 or less in service industry)
- Middle-sized firm: Firms with size above SME and capital of 5 billion yen or less
- Large firms: Firms with size above SME and capital over 5 billion yen

Industry Classification in the 2003 Questionnaire Survey

- Machinery & metal related manufacturing industry: general machinery mfg., electric machinery mfg., transport machinery mfg., precision machinery mfg., printing industry, plastic product mfg., metal fabrication mfg., iron & steel mfg., non-ferrous metal mfg., and parts of chemical industry, rubber product mfg. and ceramics product mfg.

Product Developing Firms in the 2003 Questionnaire Survey

- Product developing firms: Firms with designing function and own-designed product ratio of approx. 10% or more.

- Non-product developing firms: Firms other than the above.

2002 Case Study on Industry-Academic and Inter-corporate Collaboration in TAMA

- Survey objects
  - Collaborations aiming for development of new product or new technology
- Survey period
  - Collection of cases : Dec. 2001 - Mar. 2002 (Commission to TAMA Association)
  - Analysis : until July 2002

Number of Visited Firms in 2002 Case Study

- Collaboration case firms : 37
  - TAMA member firms : 32
  - Non-member firms : 5
- Other activity achievement case firms
  - TAMA member firms : 4
- Total : 40

Main Sources for these slides

- **児玉俊洋** [2003],「TAMA**企業の技術革新力とクラスター形成状況**」, RIETI Policy Discussion Paper Series 03-P-004 http://www.rieti.go.jp/jp/publications/pdp_summary/03100001.html.
- **児玉俊洋** [2002],「TAMA（**技術先進首都圏地域における産学及び企業間連携**」, RIETI Discussion Paper Series 02-J-012 http://www.rieti.go.jp/jp/publications/summary/02070006.html.
- Kodama, Toshihiro [2002], “Industry-Academic and Inter-corporate Collaboration in TAMA (Technology Advanced Metropolitan Area)”, RIETI Discussion Paper Series 02-E-014 http://www.rieti.go.jp/jp/publications/summary/02120003.html.

Related URLs

- **経済産業研究所**（RIETI）：http://www.rieti.go.jp/jp/index.html
- （**社**）TAMA**産業活性化協会** (TAMA Industrial Vitalization Association Inc.) http://www.tamaweb.gr.jp/TAMA/index_v3.html
- **地域クラスターセミナー** (Regional Cluster Seminar) http://www.rieti.go.jp/users/cluster-seminar/
- RIETI**コラム**0108「**日本のイノベーションを支える製品開発型中小企業**」http://www.rieti.go.jp/jp/columns/a01_0108.html
- RIETI**コラム**0058「TAMA（**技術先進首都圏地域**）**に見る日本経済の変化の胎動**」http://www.rieti.go.jp/jp/columns/a01_0058.html
- **経済産業ジャーナル**2002**年**10**月号**Research & Review「TAMA（**技術先進首都圏地域**）**－産業空洞化に対抗する連携と新規事業創造の地域モデル－**」http://www.rieti.go.jp/jp/papers/journal/0210/rr01.html
- （**財**）**たましん地域文化財団『多摩のあゆみ　第１０９号』への寄稿「多摩地域と**TAMA（**技術先進首都圏地域**）**－集積形成の沿革と産学連携地域モデル形成への展望－**」http://www.rieti.go.jp/jp/papers/contribution/kodama/01.html.