

National Research Council
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R&D and Innovation Statistics in Japan

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1. Main R&D Statistics

1.1. Survey of Research and Development

- the most important survey on R&D activities in Japan
 - R&D expenditures / R&D personnel / technology exchange
 - business enterprises / non-profit institutions and public organisations / universities and colleges
- annually
- “designated statistics”; mandatory
- postal survey
- census for large firms and medium R&D performing firms; sample survey for small R&D performing firms and firms identified on the basis of the “*Establishment and Enterprise Census*”
- response rate: 83% for the business sector
- conducted by the Statistics Bureau, MPHPT

Industrial Coverage of the Survey of Research and Development

Industrial Classification for the Survey of Research and Development

Standard Industrial Classification of Japan (Rev. 10)

code	title	code
2	Agriculture, Forestry and Fisheries	01–04
3	Mining	05–08
4	Construction	09–11
5 (6–30)	Manufacturing	12–34
31	Transport, Communication and Public Utilities	35–47, 81
32	Wholesale Trade	48, 49, 502, 51, 52 <i>less</i> 529, 53
33	Finance and Insurance	621, 622, 66–69
34	Software and Information Processing	821, 822
35	Professional Services	84
36	Other Business Services	86
37	Scientific Research Institutes	92

Sampling of the Survey of Research and Development

	condition for stratification	class by size of paid-in capital	class by industry	sampling	population	samples
total					588,846	12,944
private companies	Paid-in capital 1 billion yen or more	5 billion or more yen	(32 categories)	census	1,793	1,793
		1 billion or more but less than 5 billion yen	(32 categories)	census	2,966	2,966
	R&D performed in the latest survey sampling	100 million or more but less than 1 billion yen	(32 categories)	census	1,888	1,888
		30 million or more but less than 100 million yen	(32 categories)	sample	1,779	362
		10 million or more but less than 30 million yen	(32 categories)	sample	733	231
	sampling based on the <i>Establishment and Enterprise Census</i>	100 million or more but less than 1 billion yen	(32 categories)	sample	14,840	1,259
		30 million or more but less than 100 million yen	(32 categories)	sample	77,632	3,486
		10 million or more but less than 30 million yen	(32 categories)	sample	487,200	944
	independent administrative institutions or special public corporations on self-paying bases			all industries	census	15

Survey of Research and Development (cont'd.)

- brief history
 - started in 1953 as the “*Basic Statistical Survey of Research Institutions*”
 - in 1960, the reporting unit was changed from R&D performing establishments to enterprises for profit corporations; it remains unchanged and is school or institution for universities and colleges
 - from 1970 to 1982, the survey was frequently reviewed and added new questions

Review in 2002

- The industrial coverage was enlarged in the service sectors
- The reporting unit for researchers was changed from employing institution to engaging one
- The survey added or modified the following questions:
 - flow of R&D personnel between enterprises/institutions
 - number of doctorate recipients
 - head count as well as FTE for BE and PNP/public sectors
 - international technology exchange with affiliate companies
 - R&D expenditure by specific purposes corresponding to the current governmental prioritised fields and areas
- A survey for FTE data in HE was conducted by MEXT in 2002

Recent Results from the Survey of Research and Development

		total	business enterprises	non-profit institutions and public organizations	universities and colleges
R&D Expenditure	(billion yen) (%)	16,528.0 100.0	11,451.0 69.3	1,843.6 11.2	3,233.4 19.6
R&D Personnel (head counts)	(persons)	1,050,414	629,487	90,273	330,654
R&D Personnel (FTE)	(persons)	(to be available)	561,735	70,106	(to be available)
Researchers (head counts)	(persons)	792,699	461,962	50,027	280,710
Researchers (FTE)	(persons)	(to be available)	430,688	44,938	(to be available)

Flow of Researchers		joined							left	
		total	newly graduates	from business enterprises	of which: from affiliated companies	from non-profit institutions and public organizations	from universities and colleges	from others	total	of which: from affiliated companies
total	(persons)	56,426	28,130	11,954	3,121	7,480	6,140	2,723	39,213	4,750
business enterprises	(persons)	28,733	18,194	9,572	3,121	228	301	439	16,885	4,750
non-profit institutions and public organizations	(persons)	6,400	1,512	1,278	–	2,520	637	453	4,548	–
universities and colleges	(persons)	21,293	8,424	1,104	–	4,732	5,202	1,831	17,780	–

data: 2002 Report of the Survey of Research and Development,

<http://www.stat.go.jp/data/kagaku/2002np/index.htm>. [Data is available both in English and in Japanese; however, index available only in Japanese.]

Remaining Issues

- * *international comparability of indicators for national policy-making*
- * *policy relevance*

- stratification – size classes of firms
- more coverage – hospitals, new types of non-profit corporations
- more samples – finance and insurance
- fields of science
- fields of product/service
- foreign researchers

1.2. Other R&D-related Statistics

- Survey of R&D Activities in Private Companies (MEXT)
- Survey of Overseas Business Activities (METI)
- Basic Survey of Japanese Business Structure and Activities (METI)
- Basic Survey of Schools (MEXT)
- Survey of Intellectual Property-Related Activities (JPO, since 2002)

Statistics on the basis of administrative data collection

- *Japan Patent Office Annual Report* (JPO)
- doctorate recipients (MEXT)
- invention disclosures, implementations of “co-operative research with private companies *etc.*” in national universities, ... (MEXT)

2. Innovation Survey

2.1. Brief History of Innovation Surveys

- Yale Survey
- CMU and NISTEP Survey
 - results of the international comparison:
Research Policy, vol. 31, pp. 1349–1367 [2002]
- International Standardisation
 - initiative by OECD
 - “*Oslo Manual*” [1993; 1st rev., 1997; 2nd rev., started]
 - Community Innovation Survey (CIS) in the EEA countries

2.2. Japanese National Innovation Survey 2003 (J-NIS 2003)

- is the first comprehensive survey involving SMEs and service sectors
- is relevant to the current national S&T and innovation policies
- conducted by NISTEP of MEXT
- uses most of the core questionnaire and mostly follows the methodology recommended for the CIS 3
- modifies/adds some questions in order to fit in the Japanese context
- “approved statistics”; voluntary
- sent out on 24 January 2003; deadline: 20 February 2003
collection approved: until 31 March 2003
2 postal reminders + phone
final response received: 12 May 2003

Japanese National Innovation Survey 2003 (J-NIS 2003) (cont'd.)

- industrial coverage: manufacturing, utilities, selected services, information services, selected professional services, agriculture, forestry, fisheries, mining
- target population: 622,457 including enterprises with less than 10 persons engaged
- sampling frame: the *Establishment and Enterprise Census 2001*
- sample size: 43,174
sample survey; cut-off point: enterprises with 10 persons engaged
census in stratum of enterprises with 250 or more persons engaged
- realised samples: 9,257 (response rate: 21%)
- non-response analysis: conducted in April 2003
- results: to be published in autumn 2003

CIS 3 Core Questionnaire

- general and basic economic information
- product/process innovation; abandoned innovation activity
- expenditure; intramural R&D
- effects of innovation
- public funding for innovation
- co-operation; sources of information
- hampering factors of innovation activity
- patents and other protection methods
- strategic and organisational changes

Additional and Modified Questions

- strategic, managerial and organisational changes [Q. 12. (of J-NIS 2003)]
- appropriability [Q. 11.5.1.–11.5.5.]
- category, location and range of activities of enterprise [Q. 0.9.]
- the closest industry to the most important product innovation and the most important process innovation [Q. 1.3. and 2.3.]
- enterprise's most significant market [Q. 0.4.]
- description of the most important innovation [Q. 1.2., 1.4., 2.2., 2.4.]
- public funding for innovation, *in more detail* [Q. 7.]
- regional aspects [Q. 0.9., 8.2.]
- information sources for innovation [Q. 9.]

The J-NIS 2003 Will Tell Us the Following:

- Innovating firms
 - Where would be the (potential) actors in innovation system?
- Relationship between R&D and technological innovation
- Non-technological innovation: Organisational changes, strategy, management
 - Detailed information on changes and implementations indicates different characteristics of firms

Challenges

- The first comprehensive exercise in Japan
 - The respondents were not familiar with the survey
- Concept and definition of “innovation”
 - Non-innovating firms are requested to understand the concept and definition of “innovation” in order to participate into the survey as well as innovating firms
- Concept and definition of “product (goods/services)” and “process”
 - Firms, especially in the service sector, reported difficulties in identifying a new “product” and seemed to find problems in differentiating “process innovation” and “organisational changes”

Concluding Remarks

- It is expected that the results will provide useful information for the preparation of the next 5-year *Science and Technology Basic Plan*
- It is important to overcome unwilling participation in the survey for specific industries in the service sector
- A “systems view” on innovation would be indispensable in the design of innovation survey