

目次

I 海外及び日本の科学技術活動の概要

i 研究費

1. 研究費総額	2
1-1 主要国等の研究費の推移	2
1-1-1 主要国等の研究費の推移 (IMF 為替レート換算)	2
1-1-2 主要国等の研究費の推移 (OECD 購買力平価換算)	3
1-2 主要国等の研究費対国内総生産 (GDP) 比の推移	4
2. 研究費の負担及び使用	5
2-1 主要国等の研究費の負担	5
2-1-1 主要国等の組織別研究費負担割合	5
2-1-2 主要国等の政府負担研究費の推移 (IMF 為替レート換算)	6
2-1-3 主要国等の政府負担研究費の推移 (OECD 購買力平価換算)	7
2-1-4 主要国等の政府負担研究費割合の推移 (国防研究費を含む)	8
2-1-5 主要国等の政府負担研究費割合の推移 (国防研究費を除く)	9
2-1-6 主要国等の政府負担研究費対国内総生産 (GDP) 比の推移	10
2-2 主要国等の研究費の使用	11
2-2-1 主要国等の組織別研究費使用割合	11
2-2-2 主要国等の組織別実質研究費の推移	12
2-3 主要国等の研究費の流れ	14
2-3-1 日本	14
2-3-2 米国	15
2-3-3 ドイツ	16
2-3-4 フランス	17
2-3-5 英国	18
2-3-6 中国	19
2-3-7 韓国	20
2-3-8 ロシア	21
3. 研究者 1 人当たり研究費	22
3-1 主要国等の研究者 1 人当たり研究費	22
3-2 日本の研究者 1 人当たり研究費	23
3-2-1 日本の研究者 1 人当たり研究費の推移 (組織別)	23
3-2-2 日本の企業の研究者 1 人当たり研究費 (産業別 (上位 5 業種))	24
3-2-3 日本の大学等の教員 1 人当たり研究費 (組織別・学問別 (自然科学系))	25

4. 性格別研究費	26
4-1 主要国等の性格別研究費	26
4-1-1 主要国等の性格別研究費割合	26
4-1-2 主要国等の基礎研究費割合の推移	27
4-2 日本の性格別研究費	28
4-2-1 日本の性格別研究費割合（組織別）	28
4-2-2 日本の性格別研究費割合の推移（組織別）	29
5. 産業別研究費	31
5-1 主要国等の製造業の業種別研究費割合	31
5-2 主要国等の研究費総額（産業）に占めるサービス業の割合の推移	33
6. 日本の組織別研究費	34
6-1 日本の組織別使用研究費の推移	34
6-2 日本の負担源別研究費の推移	35
6-3 日本の企業の研究費の推移（産業別）	36
6-4 日本の非営利団体・公的機関の研究費の推移（組織別）	37
6-5 日本の大学等の研究費の推移	38
6-5-1 日本の大学等の研究費の推移（組織別）	38
6-5-2 日本の大学等の研究費の推移（学問別（自然科学））	39
7. 日本の費目別研究費	40
7-1 日本の費目別研究費の推移	40
7-2 日本の企業の費目別研究費割合（（産業別）主要製造業）	41
7-3 日本の非営利団体・公的機関の費目別研究費割合（組織別）	42
7-4 日本の大学等の費目別研究費割合（組織別・学問別（自然科学系））	43
8. 主要国等の科学技術関係予算の推移	44
ii 研究人材	
9. 研究者数	46
9-1 主要国等の研究者数の推移	46
9-2 主要国等の人口及び労働力人口1万人当たりの研究者数の推移	47
9-2-1 主要国等の人口1万人当たりの研究者数	47
9-2-2 主要国等の労働力人口1万人当たりの研究者数	48
9-3 主要国等の研究者数の組織別割合	49
9-4 日本の研究者数の推移（組織別）	50
9-5 日本の女性研究者数と研究者総数に占める 女性研究者数の割合の推移（実数）	51
9-6 日本の博士号保有研究者数（組織別）と研究者総数に占める 博士号保有者割合の推移（実数）	52
9-7 日本の企業の研究者数	53

9-7-1	日本の企業の産業別研究者数割合	53
9-7-2	日本の企業の専門別研究者数割合	54
9-7-3	日本の企業における従業者1万人当たりの研究者数 (産業別(上位5業種))	55
9-8	日本の非営利団体・公的機関の研究者数	56
9-8-1	日本の非営利団体・公的機関の研究者数の推移(組織別)	56
9-8-2	日本の非営利団体・公的機関の専門別研究者数割合 (組織別)(実数)	57
9-9	日本の大学等の研究者数	58
9-9-1	日本の大学等の研究者数の推移(組織別)	58
9-9-2	日本の大学等の専門別研究本務者数の推移	59
9-9-3	日本の大学等の専門別研究本務者数の推移(自然科学)	60
9-9-4	日本の大学等の職種別研究本務者数割合(組織別)	61
9-9-5	日本の大学等の学問別研究本務者数割合(自然科学)	62
10.	研究関係従業者数	63
10-1	主要国等の研究者1人当たりの研究支援者数	63
10-2	日本の研究関係従業者数の推移	64
10-3	日本の研究者1人当たりの研究支援者数の推移(組織別)	65
10-4	日本の研究関係従業者数割合(組織別)	66
11.	研究人材の輩出と雇用	67
11-1	研究人材の輩出	67
11-1-1	主要国の学部・大学院に在籍する全学生数に占める 大学院学生数割合	67
11-1-2	主要国の学位取得者数(自然科学系)(全体(大学院段階))	68
11-1-3	主要国の学位取得者数(自然科学系)(博士)	69
11-1-4	日本の学位取得者数の推移(自然科学系)(修士)	70
11-1-5	日本の学位取得者数の推移(自然科学系)(博士)	71
11-2	研究人材の雇用	72
11-2-1	日本の大学の学位別進路動向(大学卒業時)	72
11-2-2	日本の大学の学位別進路動向(修士課程終了時)	73
11-2-3	日本の大学の学位別進路動向(博士課程終了時)	74
11-2-4	日本の主要産業における専門別採用状況	75
11-2-5	日本の主要産業における学位別採用状況	76
iii	研究成果	
12.	論文	78
12-1	論文数シェアと被引用数シェア	78
12-1-1	主要国等の論文数シェアと被引用数シェアの推移(単年)	78

12-1-2 主要国等の論文数シェアと被引用数シェアの推移（5年累積）	79
12-2 論文の相対被引用度	80
12-2-1 主要国等の論文の相対被引用度の推移	80
12-2-2 日本の分野別相対被引用度	81
12-3 分野別論文数	82
12-3-1 主要国等の分野別論文数割合	82
12-3-2 日本の分野別論文数シェア	83
12-4 日本の分野別論文相対比較優位の推移	84
13. 特許	85
13-1 主要国等の特許出願・登録動向	85
13-1-1 主要国等の特許出願件数の推移	85
13-1-2 主要国等の特許登録件数の推移	86
13-2 日本人の外国への特許出願・登録件数	87
13-2-1 日本人の外国への特許出願件数の推移	87
13-2-2 日本人の外国での特許登録件数の推移	88
13-3 日本における特許出願・登録動向	89
13-3-1 日本における特許出願件数の推移	89
13-3-2 日本における特許登録件数の推移	90
13-4 日本での外国人による特許出願・登録件数	91
13-4-1 日本での外国人による特許出願件数の推移	91
13-4-2 日本での外国人による特許登録件数の推移	92
14. 技術貿易	93
14-1 主要国における技術貿易額の推移	93
14-2 主要国における技術貿易収支比の推移	94
14-3 日本と各国（地域）との技術貿易動向	95
14-3-1 日本と主要国との技術貿易収支比の推移	95
14-3-2 日本の技術貿易における国（地域）別構成比	96
14-3-3 日本の地域別技術貿易額	97
14-4 日本の産業別技術貿易動向	98
14-4-1 日本の主要産業別技術貿易額の推移	98
14-4-2 日本の主要産業別技術貿易収支比の推移	99
15. ハイテク産業	100
15-1 主要国等のハイテク産業の輸出額占有率動向	100
15-1-1 主要国等におけるハイテク産業輸出額国別占有率の推移	100
15-1-2 主要国等におけるハイテク産業別輸出額占有率	101
15-2 日本の全製造業・ハイテク産業の輸出入額の推移	102
15-3 主要国等のハイテク産業貿易収支比の推移	103
15-4 日本のハイテク産業の産業別貿易収支	104

II 日本の科学技術

16. 総括	106
16-1 研究費等の推移	106
16-2 組織別研究実施機関数の推移	108
16-3 組織別研究費の推移	110
16-4 負担源別研究費の推移	112
16-5 性格別研究費の推移	114
16-6 費目別研究費の推移	116
16-7 特定目的別研究費の推移	118
16-8 研究関係従業者数の推移	120
16-9 組織別研究者数の推移	122
16-10 学問・専門・組織別研究者数（実数）	124
16-11 組織別研究者1人当たりの研究費の推移	125
16-12 学位授与数	126
16-13 学生数及び卒業生数	127
16-13-1 大学	127
16-13-2 大学院修士課程・博士課程	127
16-14 卒業生の進路	128
16-14-1 大学卒業生	128
16-14-2 大学院修了者	129
16-15 技術士	130
16-15-1 技術士の第二次試験合格者及び登録者数の推移（技術士）	130
16-15-2 技術士の第一次試験合格者及び登録者数の推移（技術士補）	131
17. 企業	132
17-1 産業・資本金規模別研究費	132
17-2 産業・資本金規模・性格別研究費	134
17-3 産業・資本金規模・費目別研究費	136
17-4 産業別研究費の対売上高比率	138
17-5 産業・資本金規模別研究関係従業者数	139
17-6 産業・資本金規模別研究者数の推移	140
17-7 産業・学問別研究者数（実数）	141
18. 非営利団体・公的機関	143
18-1 組織・学問別研究費の推移	143
18-2 組織・学問・費目別研究費	144
18-3 組織・学問別研究関係従業者数	146
18-4 組織・学問別研究者数の推移	147
18-5 組織・学問別研究者数（実数）	148
19. 大学等	151

19-1 組織・学問別研究費の推移	151
19-2 組織・学問・費目別研究費	152
19-3 組織・学問別研究関係従業者数	154
19-4 組織・学問別研究者数の推移	155
19-5 組織・学問・職種別研究者数	156
19-6 組織・学問別研究者数（実数）	157
20. 技術貿易	158
20-1 技術貿易額の推移	158
20-2 産業別技術貿易額の推移	160
20-2-1 対価受取額	160
20-2-2 対価支払額	162
20-3 地域別・国別技術貿易額の推移	164
20-3-1 対価受取額	164
20-3-2 対価支払額	166
20-4 産業・地域別技術貿易額	168
20-5 日本の主要業種における技術貿易の国（地域）別収支	170
21. 特許	172
21-1 日本人・外国人別特許件数の推移	172
21-1-1 出願	172
21-1-2 登録	173
21-2 部門別特許件数の推移	174
21-2-1 出願	174
21-2-2 登録	174
21-3 日本における国籍別特許件数の推移	176
21-3-1 出願	176
21-3-2 登録	176
21-4 日本人の外国への特許件数の推移	178
21-4-1 出願	178
21-4-2 登録	179
21-5 日本人の外国・自国別特許件数の推移	180
21-5-1 出願	180
21-5-2 登録	180
22. 産学連携	181
22-1 国立大学等と民間等との共同研究実施件数の推移	181
23. 国際交流	182
23-1 地域別交流者数（派遣）	182
23-2 地域別交流者数（受入）	182
23-3 国別（上位10か国）交流者数（派遣）	183

23-4 国別（上位10 国）交流者数（受入）	183
23-5 研究者交流の推移	184
24. 科学技術関係経費	185
24-1 科学技術関係経費の推移	185
24-1-1 項目別	185
24-1-2 府省庁別	186
24-1-3 組織別	187
24-2 政府関係試験研究機関等における科学技術関係経費の推移	188
24-3 宇宙関係予算の推移	190
24-4 原子力関係予算の推移	191
24-5 海洋科学技術関連経費の推移	192
24-6 地震調査研究関係予算の推移	193
24-7 競争的資金	194
25. 科学技術行政機構図	196
Ⅲ 各国の科学技術	
26. 各国の科学技術の概要	202
26-1 米国	202
26-1-1 米国 総括	202
26-1-2 米国 組織別研究費の推移	204
26-1-3 米国 負担源別研究費割合の推移	205
26-1-4 米国 性格別研究費の推移	206
26-1-5 米国 組織別研究者数の推移	207
26-1-6 米国 科学技術行政機構図	208
26-2 欧州連合	214
26-2-1 欧州連合（EU-15）総括	214
26-2-2 欧州連合（EU-28）総括	216
26-2-3 欧州連合 組織別研究費の推移	218
26-2-4 欧州連合 負担源別研究費割合の推移	219
26-2-5 欧州連合 組織別研究者数の推移	220
26-2-6 欧州連合 科学技術行政機構図	222
26-3 ドイツ	224
26-3-1 ドイツ 総括	224
26-3-2 ドイツ 組織別研究費の推移	226
26-3-3 ドイツ 負担源別研究費割合の推移	227
26-3-4 ドイツ 性格別研究費の推移	228
26-3-5 ドイツ 組織別研究者数の推移	229
26-3-6 ドイツ 科学技術行政機構図	230

26-4 フランス	232
26-4-1 フランス 総括.....	232
26-4-2 フランス 組織別研究費の推移	234
26-4-3 フランス 負担源別研究費割合の推移	235
26-4-4 フランス 性格別研究費の推移	236
26-4-5 フランス 組織別研究者数の推移	237
26-4-6 フランス 科学技術行政機構図	238
26-5 英国	240
26-5-1 英国 総括	240
26-5-2 英国 組織別研究費の推移	242
26-5-3 英国 負担源別研究費割合の推移	243
26-5-4 英国 組織別研究者数の推移	244
26-5-5 英国 科学技術行政機構図	245
26-6 中国	246
26-6-1 中国 総括	246
26-6-2 中国 組織別研究費の推移	248
26-6-3 中国 負担源別研究費割合の推移	249
26-6-4 中国 性格別研究費の推移	250
26-6-5 中国 組織別研究者数の推移	251
26-6-6 中国 科学技術行政機構図	252
26-7 韓国	254
26-7-1 韓国 総括	254
26-7-2 韓国 組織別研究費の推移	256
26-7-3 韓国 負担源別研究費割合の推移	257
26-7-4 韓国 性格別研究費の推移	258
26-7-5 韓国 組織別研究者数の推移	259
26-7-6 韓国 科学技術行政機構図	260
26-8 ロシア	262
26-8-1 ロシア 総括	262
26-8-2 ロシア 組織別研究費の推移	264
26-8-3 ロシア 負担源別研究費割合の推移	265
26-8-4 ロシア 性格別研究費の推移	266
26-8-5 ロシア 組織別研究者数の推移	267
26-8-6 ロシア 科学技術行政機構図	268
26-9 カナダ	269
26-9-1 カナダ 組織別研究費の推移	269
26-9-2 カナダ 負担源別研究費割合の推移	270
26-9-3 カナダ 組織別研究者数の推移	271

26-9-4 カナダ 科学技術行政機構図	272
26-10 その他の国 / 地域	274
27. 科学技術関係予算	280
28. 研究費	282
28-1 組織別研究費の推移	282
28-2 性格別研究費割合	284
29. 研究人材	286
29-1 組織別研究者数の推移	286
29-2 研究関係従業者数	288
29-3 専攻分野別学位取得者数の推移	289
30. ノーベル賞及びフィールズ賞の各国別受賞者数	290
31. 技術貿易額	292
32. 特許	294
32-1 特許件数の推移	294
32-1-1 出願	294
32-1-2 登録	295
32-2 国籍別特許件数	296
32-2-1 出願	296
32-2-2 登録	297

附属資料

33. 日本の財政	300
33-1 一般会計、特別会計、政府関係機関及び財政投融资の推移	300
33-2 一般会計歳出予算の推移	300
34. 日本の研究費デフレーター	302
35. 主要国等のGDP（国内総生産）デフレーター	304
36. 主要国等の通貨の円換算率	305
36-1 IMF 為替レート	305
36-2 購買力平価による円換算率	306

CONTENTS

I	Current status of S&T in Japan and other selected countries	
i	R&D expenditures	
1.	Total R&D expenditures	2
1-1	Trends in R&D expenditures in selected countries	2
1-1-1	Trends in R&D expenditures in selected countries (IMF exchange rate conversion)	2
1-1-2	Trends in R&D expenditures in selected countries (OECD purchasing power parity conversion)	3
1-2	Trends in R&D expenditures as a percentage of GDP in selected countries	4
2.	R&D expenditures by source of funds and sector of performance	5
2-1	R&D expenditures by source of funds in selected countries	5
2-1-1	Composition of R&D expenditures by source of funds in selected countries	5
2-1-2	Trends in government-financed R&D expenditures in selected countries (IMF exchange rate conversion)	6
2-1-3	Trends in government-financed R&D expenditures in selected countries (OECD purchasing power parity conversion)	7
2-1-4	Trends in government-financed R&D expenditures in selected countries - Percentage of R&D expenditures financed by government	8
2-1-5	Trends in government-financed R&D expenditures in selected countries - Percentage of R&D expenditures financed by government exclusive of defence R&D budget	9
2-1-6	Trends in government-financed R&D expenditures as a percentage of GDP in selected countries	10
2-2	R&D expenditures by sector of performance in selected countries	11
2-2-1	Composition of R&D expenditures by sector of performance in selected countries	11
2-2-2	R&D expenditures growth (in real terms) by sector of performance in selected countries	12
2-3	R&D expense flows in selected countries	14
2-3-1	Japan	14

2-3-2	United States	15
2-3-3	Germany	16
2-3-4	France	17
2-3-5	United Kingdom	18
2-3-6	China	19
2-3-7	Rep. of Korea	20
2-3-8	Russian Federation	21
3.	R&D expenditures per researcher	22
3-1	R&D expenditures per researcher in selected countries	22
3-2	R&D expenditures per researcher in Japan	23
3-2-1	Trends in R&D expenditures per researcher by research sector in Japan	23
3-2-2	R&D expenditures per researcher by industry (top five industrial categories) in Japan	24
3-2-3	R&D expenditures per teacher at universities and colleges by kind of organization and field of science (natural sciences and engineering only) in Japan	25
4.	R&D expenditures by type of activity	26
4-1	R&D expenditures by type of activity in selected countries	26
4-1-1	Composition of R&D expenditures by type of activity in selected countries	26
4-1-2	Trends in the percentage of basic research expenditures in selected countries	27
4-2	R&D expenditures by type of activity in Japan.....	28
4-2-1	Composition of R&D expenditures by research sector and type of activity in Japan	28
4-2-2	Trends in the composition of R&D expenditures by research sector and type of activity in Japan	29
5.	R&D expenditures by industry	31
5-1	Composition of manufacturing industry research expenditures by industry in selected countries	31
5-2	Trends in the percentage of business enterprise expenditure on R&D performed in service industries	33
6.	R&D expenditures by research sector in Japan	34
6-1	Trends in R&D expenditures by sector of performance in Japan	34
6-2	Trends in R&D expenditures by source of funds in Japan	35
6-3	Trends in business enterprise expenditure on R&D by industry in Japan.....	36

6-4	Trends in non-profit institutions and public organizations expenditure on R&D by research sector in Japan	37
6-5	Trends in universities and colleges expenditure on R&D in Japan.....	38
6-5-1	Trends in universities and colleges expenditure on R&D by kind of organization in Japan.....	38
6-5-2	Trends in universities and colleges expenditure on R&D by field of science (natural sciences and engineering only) in Japan	39
7.	R&D expenditures by sector of type of cost in Japan.....	40
7-1	Trends in R&D expenditures by sector of type of cost in Japan	40
7-2	Composition of business enterprise expenditure on R&D by industry (major industries) and sector of type of cost in Japan	41
7-3	Composition of non-profit institutions and public organizations expenditure on R&D by sector of type of cost and research sector in Japan	42
7-4	Composition of universities and colleges expenditure on R&D by kind of organization, field of science (natural sciences and engineering only) and sector of type of cost in Japan	43
8.	Trends in S&T budget in selected countries	44
ii	R&D personnel	
9.	Researchers	46
9-1	Trends in the number of researchers in selected countries	46
9-2	Trends in the number of researchers per 10,000 people and per 10,000 labour force in selected countries	47
9-2-1	Trends in the number of researchers per 10,000 people in selected countries	47
9-2-2	Trends in the number of researchers per 10,000 labour force in selected countries	48
9-3	Composition of the number of researchers by research sector in selected countries.....	49
9-4	Trends in the number of researchers by research sector in Japan.....	50
9-5	Trends in the number of female researchers and female researchers as a percentage of total researchers in Japan (head-counts)	51

9-6	Trends in the number of doctoral researchers by kind of organization and doctoral researchers as a percentage of total researchers in Japan (head-counts)	52
9-7	Business enterprise researchers in Japan	53
9-7-1	Composition of the number of business enterprises researchers by industry in Japan	53
9-7-2	Composition of the number of business enterprises researchers by field of science and specialty in Japan	54
9-7-3	Number of business enterprises researchers per 10,000 employees by industry (top five industrial categories) in Japan	55
9-8	Non-profit institutions and public organizations researchers in Japan	56
9-8-1	Trends in the number of non-profit institutions and public organizations researchers by kind of organization in Japan	56
9-8-2	Composition of the number of non-profit institutions and public organizations researchers by kind of organization and field of science in Japan (head-counts)	57
9-9	Universities and colleges researchers in Japan	58
9-9-1	Trends in the numbers of universities and colleges researchers by kind of organization	58
9-9-2	Trends in the number of regular researchers at universities and colleges by field of science	59
9-9-3	Trends in the number of regular researchers at universities and colleges by field of specialty (Natural sciences and engineering only)	60
9-9-4	Composition of regular researchers at universities and colleges by kind of organization and kind of occupation in Japan	61
9-9-5	Composition of regular researchers in natural sciences and engineering at universities and colleges by kind of occupation and field of specialty in Japan	62
10.	Persons employed in R&D	63
10-1	Number of research assistants per researcher in selected countries	63
10-2	Trends in the number of Persons employed in R&D by kind of occupation in Japan	64

10-3 Trends in the number of research assistants per researcher by research sector in Japan	65
10-4 Composition of the number of Persons employed in R&D by research sector, kind of organization and kind of occupation in Japan	66
11. Production and employment of R&D personnel	67
11-1 Production of R&D personnel	67
11-1-1 Graduate students as a percentage of total students in selected countries.....	67
11-1-2 Number of awarded degrees by field of science in selected countries (Natural sciences and engineering) (Master's and doctoral degrees)	68
11-1-3 Number of awarded degrees by field of science in selected countries (Natural sciences and engineering) (Doctoral degrees)	69
11-1-4 Trends in the number of awarded degrees by field of science in Japan (Natural sciences and engineering) (Master's degrees)	70
11-1-5 Trends in the number of awarded degrees by field of science in Japan (Natural sciences and engineering) (Doctoral degrees)	71
11-2 Employment of R&D personnel	72
11-2-1 Composition of the number of graduates by field of study and career choice in Japan (Upon completion of bachelor's degree)	72
11-2-2 Composition of the number of graduates by field of study and career choice in Japan (Upon completion of master's degree)	73
11-2-3 Composition of the number of graduates by field of study and career choice in Japan (Upon completion of doctoral degree)	74
11-2-4 Employment situation in major industries by field of science in Japan	75
11-2-5 Employment situation in major industries by academic degree in Japan	76
iii R&D performance	
12. Scientific papers	78

12-1 Trends in production share and citation share in selected countries	78
12-1-1 Trends in production share and citation share in selected countries (1 year period)	78
12-1-2 Trends in production share and citation share in selected countries (5 year overlapping period)	79
12-2 Relative citation impact for scientific papers	80
12-2-1 Trends in the relative citation impact for scientific papers in selected countries	80
12-2-2 Relative citation impact by research field in Japan	81
12-3 Number of scientific papers by research field	82
12-3-1 Composition of the number of scientific papers by research field in selected countries	82
12-3-2 Japan's share of scientific papers by research field.....	83
12-4 Trends in relative comparative advantage of scientific papers by research field in Japan	84
13. Patents	85
13-1 Patent applications and grants by country of origin	85
13-1-1 Trends in number of patent applications by country of origin	85
13-1-2 Trends in number of patent grants by country of origin	86
13-2 Number of Japanese-oriented overseas patent applications and grants	87
13-2-1 Trends in number of Japanese-oriented overseas patent applications	87
13-2-2 Trends in number of Japanese-oriented overseas patent grants	88
13-3 Patent applications and grants at the Japan Patent Office	89
13-3-1 Trends in number of patent applications at the Japan Patent Office	89
13-3-2 Trends in number of patent grants at the Japan Patent Office	90
13-4 Number of foreign-oriented patent applications and grants at the Japan Patent Office	91
13-4-1 Trends in number of foreign-oriented patent applications at the Japan Patent Office	91
13-4-2 Trends in number of foreign-oriented patent grants at the Japan Patent Office	92

14. Technology Trade	93
14-1 Trends in technology trade value in selected countries	93
14-2 Trends in technology trade balance in selected countries	94
14-3 Technology trade of Japan with selected countries/regions	95
14-3-1 Trends in Japan's Technology trade balance with selected countries.....	95
14-3-2 Ratio of Japan's technology trade vis-à-vis selected countries/ regions	96
14-3-3 Japan's technology trade value flows by geographic area	97
14-4 Technology trade by industry sector in Japan	98
14-4-1 Technology trade value in Japan's major industrial sectors	98
14-4-2 Trends in technology trade balance in Japan's major industrial sectors	99
15. High-Tech industries	100
15-1 Export market shares for high-tech products in selected countries	100
15-1-1 Trends in export market shares for high-tech products by country in selected countries	100
15-1-2 Share of high-tech products by country manufactured in selected countries.....	101
15-2 Trends in imports and exports, by value, for Japan's general manufacturing industry, and the high-tech industry	102
15-3 Trends in high-tech balance of payment ratios for selected countries	103
15-4 Balance of payments for Japan's high-tech trade by industry	104
II Indicators of S&T in Japan	
16. Summary	106
16-1 R&D expenditures and the number of researchers	106
16-2 Number of R&D performing institutions by research sector and kind of organization	108
16-3 R&D expenditures by research sector and kind of organization ..	110
16-4 R&D expenditures by source of funds	112
16-5 R&D expenditures by type of activity (Natural sciences and engineering only)	114
16-6 R&D expenditures by sector of type of cost	116

16-7 R&D expenditures by selected objective	118
16-8 Number of R&D personnel by kind of occupation	120
16-9 Number of researchers by research sector and kind of organization	122
16-10 Number of researchers by research sector, field of science and specialty (head-counts).....	124
16-11 R&D expenditures per researcher by research sector	125
16-12 Number of degrees granted	126
16-13 Number of students enrolled and graduates	127
16-13-1 Number of students enrolled and graduates of universities and colleges	127
16-13-2 Number of students enrolled and graduates of graduate schools	127
16-14 Destination of graduates	128
16-14-1 Number of graduates of universities and colleges by field of study and industry	128
16-14-2 Number of graduates of graduate schools by field of study and industry	129
16-15 Professional engineer	130
16-15-1 Number of passed registered professional engineer	130
16-15-2 Number of passed registered of associate professional engineer	131
17. Business enterprises	132
17-1 R&D expenditures by size of capital and industry	132
17-2 R&D expenditures by type of activity, size of capital and industry	134
17-3 R&D expenditures by sector of type of cost, size of capital and industry	136
17-4 Ratio of R&D expenditures to net sales by industry	138
17-5 Number of R&D personnel by kind of occupation, size of capital and industry	139
17-6 Number of researchers by size of capital and industry	140
17-7 Number of researchers by field of science and industry (head-counts)	141
18. Non-profit institutions and public organizations	143

18-1 R&D expenditures by kind of organization and field of science ..	143
18-2 R&D expenditures by sector of type of cost, kind of organization and field of science	144
18-3 Number of R&D personnel by kind of occupation, kind of organization and field of science	146
18-4 Number of researchers by kind of organization and field of science	147
18-5 Number of researchers by kind of organization and field of science (head-counts)	148
19. Universities and colleges	151
19-1 R&D expenditures by kind of organization and field of science ..	151
19-2 R&D expenditures by sector of type of cost, kind of organization and field of science	152
19-3 Number of R&D personnel by kind of occupation, kind of organization and field of science	154
19-4 Number of regular researchers by kind of organization and field of science	155
19-5 Number of regular researchers by kind of occupation, kind of organization and field of science	156
19-6 Number of regular researchers by field of science and kind of Organization (head-counts)	157
20. Technology trade	158
20-1 Technology trade value	158
20-2 Technology trade value by industry	160
20-2-1 Technology receipts by industry	160
20-2-2 Technology payments by industry	162
20-3 Technology trade value by country and geographic area	164
20-3-1 Technology receipts by country and geographic area	164
20-3-2 Technology payments by country and geographic area	166
20-4 Technology trade value by geographic area and industry	168
20-5 Technology trade balance in Japan's major industrial sectors by country and region	170
21. Patents	172
21-1 Number of patent applications and grants by Japanese and foreign nationals	172
21-1-1 Patent applications	172
21-1-2 Patent grants	173

21-2 Number of patents by field	174
21-2-1 Patent applications	174
21-2-2 Patent grants	174
21-3 Number of patents in Japan by applicants' nationality	176
21-3-1 Patent applications	176
21-3-2 Patent grants	176
21-4 Number of Japanese-oriented overseas patents	178
21-4-1 Patent applications	178
21-4-2 Patent grants	179
21-5 Number of overseas and Japanese patents by Japanese applicants	180
21-5-1 Patent applications	180
21-5-2 Patent grants	180
22. Industry-academy cooperation	181
22-1 Trend in the number of joint research projects between national universities and the private sector	181
23. International researchers exchange	182
23-1 Number of Japanese researchers dispatched abroad by geographic area	182
23-2 Number of foreign researchers invited to Japan by geographic area	182
23-3 Number of Japanese researchers dispatched abroad by top 10 countries	183
23-4 Number of foreign researchers invited to Japan by top 10 countries	183
23-5 Progress of researchers exchange	184
24. S&T budget	185
24-1 Budget appropriations for S&T	185
24-1-1 Budget appropriations for S&T by item	185
24-1-2 Budget appropriations for S&T by ministry and agency	186
24-1-3 Budget appropriations for S&T by kind of organization	187
24-2 Budget appropriations for government research institutes	188
24-3 Budget appropriations for space development by ministry/ agency	190
24-4 Budget appropriations for nuclear development by ministry/ agency	191
24-5 Budget appropriations for ocean development by ministry/ agency	192

24-6 Budget appropriations for earthquake research by ministry/ agency	193
24-7 Competitive funding by ministry/agency.....	194
25. S&T administrative organization charts	196

III Indicators of S&T in selected countries

26. Outline of R&D activities in selected countries	202
26-1 United States	202
26-1-1 United States summary	202
26-1-2 R&D expenditures by performance sector in the US	204
26-1-3 R&D expenditures by source of funds in the US	205
26-1-4 R&D expenditures by type of activity in the US	206
26-1-5 Number of researchers by research sector in the US	207
26-1-6 S&T administrative organizational charts in the US	208
26-2 European Union	214
26-2-1 EU-15 summary	214
26-2-2 EU-28 summary	216
26-2-3 R&D expenditures by performance sector in EU	218
26-2-4 R&D expenditures by source of funds in EU	219
26-2-5 Number of researchers by research sector in EU	220
26-2-6 S&T administrative organizational charts in EU.....	222
26-3 Germany	224
26-3-1 Germany summary	224
26-3-2 R&D expenditures by performance sector in Germany	226
26-3-3 R&D expenditures by source of funds in Germany	227
26-3-4 R&D expenditures by type of activity in Germany	228
26-3-5 Number of researchers by research sector in Germany	229
26-3-6 S&T administrative organizational charts in Germany	230
26-4 France	232
26-4-1 France summary	232
26-4-2 R&D expenditures by performance sector in France	234
26-4-3 R&D expenditures by source of funds in France.....	235
26-4-4 R&D expenditures by type of activity in France	236
26-4-5 Number of researchers by research sector in France	237
26-4-6 S&T administrative organizational charts in France	238
26-5 United Kingdom	240
26-5-1 United Kingdom summary	240
26-5-2 R&D expenditures by performance sector in the UK	242

26-5-3 R&D expenditures by source of funds in the UK	243
26-5-4 Number of researchers by research sector in the UK	244
26-5-5 S&T administrative organizational charts in the UK	245
26-6 China	246
26-6-1 China summary	246
26-6-2 R&D expenditures by performance sector in China	248
26-6-3 R&D expenditures by source of funds in China	249
26-6-4 R&D expenditures by type of activity in China	250
26-6-5 Number of researchers by research sector in China	251
26-6-6 S&T administrative organizational charts in China	252
26-7 Rep. of Korea	254
26-7-1 Republic of Korea summary	254
26-7-2 R&D expenditures by performance sector in Republic of Korea	256
26-7-3 R&D expenditures by source of funds in Republic of Korea ..	257
26-7-4 R&D expenditures by type of activity in Republic of Korea ..	258
26-7-5 Number of researchers by research sector in Republic of Korea	259
26-7-6 S&T administrative organizational charts in Republic of Korea	260
26-8 Russian Federation	262
26-8-1 Russian Federation summary	262
26-8-2 R&D expenditures by performance sector in Russian Federation	264
26-8-3 R&D expenditures by source of funds in Russian Federation	265
26-8-4 R&D expenditures by type of activity in Russian Federation	266
26-8-5 Number of researchers by research sector in Russian Federation	267
26-8-6 S&T administrative organizational charts in Russian Federation	268
26-9 Canada	269
26-9-1 R&D expenditures by performance sector in Canada	269
26-9-2 R&D expenditures by source of funds in Canada	270
26-9-3 Number of researchers by research sector in Canada	271
26-9-4 S&T administrative organizational charts in Canada	272
26-10 Other countries/regions	274

27. S&T budget	280
28. R&D expenditures	282
28-1 R&D expenditures by research sector	282
28-2 R&D expenditures by research sector and type of activity	284
29. R&D personnel	286
29-1 Number of researchers by research sector	286
29-2 Number of R&D personnel by kind of occupation	288
29-3 Number of degrees granted by field of science	289
30. Number of Nobel Prize and Fields Prize winners by country	290
31. Technology trade value	292
32. Patents	294
32-1 Number of patents by country	294
32-1-1 Patent applications	294
32-1-2 Patent grants	295
32-2 Number of patents by applicant's nationality	296
32-2-1 Patent applications	296
32-2-2 Patent grants	297

Appendix

33. Central government finance in Japan	300
33-1 Budget by type of account in Japan	300
33-2 General accounts in Japan	300
34. R&D deflators in Japan	302
35. GDP deflators in selected countries	304
36. Exchange rates for selected countries	305
36-1 IMF exchange rates to Yen for selected countries	305
36-2 Purchasing power parities to Yen for selected countries	306