

SCIENTISTS AND ENGINEERS IN FINLAND: 1993

by

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International Programs Center
Population Division
U.S. Bureau of the Census
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IPC Staff Paper
No. 91

August 1997

IPC STAFF PAPER
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This report is based on activities supported by the National Science Foundation under Agreement No. SRS-9528607. Any opinions, findings, and conclusions or recommendations expressed herein are those of the author and do not necessarily reflect the views of the National Science Foundation.

EXECUTIVE SUMMARY

The typical member of the group “Scientists and Engineers” (S/E)¹ in Finland is a 39- year-old male, vocational school graduate, private sector employee (typically in services or, to a lesser extent, manufacturing). There are exceptions to this characterization since one-fifth of scientists and engineers are female, and they are more likely to work in the public sector of the economy. Females also tend to be more highly educated. Changes in the Finnish economy have highlighted the role of scientists and engineers. Following a rapid increase in research and development (R&D) spending since the early 1980s, significantly increased high-technology exports have supplemented the country’s traditional reliance on forestry and metallurgy exports. This has helped Finland adapt to the disruption of longstanding trade arrangements with the former Soviet Union and expedited integration with the rest of Europe.

¹Data in these reports refer to non-academic scientists and engineers.

PREFACE

The International Programs Center conducts demographic and economic studies, some of which are issued as Staff Papers. A complete list is included at the end of this report.

We are grateful to Statistics Finland for providing data from the Regional Employment Statistics Register, dated December 31, 1993, upon which the tables and charts in this report are based. Within the International Programs Center, thanks are due to Lois Darmohray and Beverly Mathis for secretarial support. We cannot assure the accuracy of the information in this report since outside data are not subjected to the same statistical reviews the Bureau performs on its own data.

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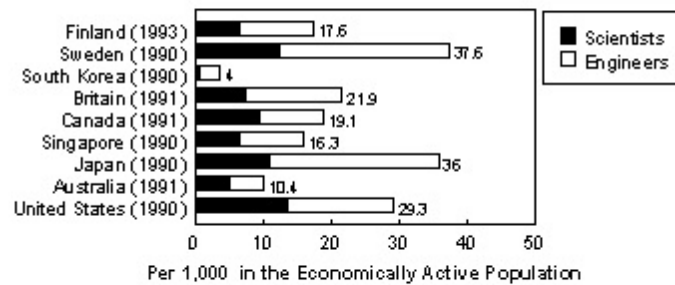
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INTRODUCTION

This report presents statistics on scientists and engineers (S/E) in Finland based upon the 1993 regional employment statistics register. Finland lies in the middle range of countries in this series concerning the share of scientists and engineers in the economically active population.² In 1993, Finland had approximately 18 scientists and engineers per 1,000 members of its economically active population (Figure 1). S/E's education levels far exceed those of the overall labor force and have helped Finland become a leader in selected areas of communications technology. Appendix tables provide detailed information upon which the graphic presentation is based. Users wishing to compare data in this report with those of other countries should consult the list of IPC Staff Papers in the back of this report. The most recently published report of this series is "Scientists and Engineers in Sweden: 1990."

²Generally, this refers to the entire population in the working ages, although definitions may vary across countries.

Figure 1. Scientists and Engineers per 1,000 Members of the Economically Active Population*



* Working age populations. Differences in ages between countries may distort cross-national comparisons.

Source: Table F11-1(3); Stat. Finland, 1997 a, p. 20; Zaslav, 1997c, p. 2.

Males largely populate the scientist and engineer occupations.

The vast majority of scientists and engineers (80 percent) are male (Table FIN-1(93))³. This contrasts sharply with the sex breakdown of the Finnish labor force and the economically active population, both of which are 53 percent male (Statistics Finland, 1995b, p. 52; and U.S. Bureau of the Census, *International Data Base*). In each of the countries in this series,⁴ males are represented far more heavily among scientists and engineers than in the overall economically active population (Zaslow, 1997c, p. 3). When arranged from low to high, Finland is located in the mid-range.

Males' preponderance among science and engineering occupations seems likely to continue. In the overall labor force, increases in females' participation slowed by the early 1980s (Centre, 1997a, p. 2). Males' share of S/E under age 30 (77 percent) is nearly equal to that of the overall S/E population (Table FIN-1(93)). In addition, the minor difference between the average ages by sex (39 and 38 for males and females, respectively) suggests that females have been in the field for some time and are not an untapped source of new S/E.

³Taking account of full-time equivalencies does not affect the difference in sex composition materially. In 1993, just 11 percent of employed Finnish females had part-time jobs, compared with 6 percent of employed males (Centre, 1997a, p. 6; and Statistics Finland, 1995c, pp. 55, 56). By contrast in Sweden in 1993, 41 percent of employed females and 9 percent of employed males worked part-time (Statistics Sweden, 1996, p. 168). However, international comparisons of part-time work may be distorted by differing definitions of "part-time." For instance, Finnish authorities define it as being less than 30 hours per week, compared with less than 35 hours in Sweden (Statistics Finland, 1995b, p. 57; Statistics Sweden, 1996, p.168).

⁴These are Australia, Britain, Canada, Japan, Singapore, South Korea and Sweden.

Scientists and engineers are dispersed widely among the employment categories.

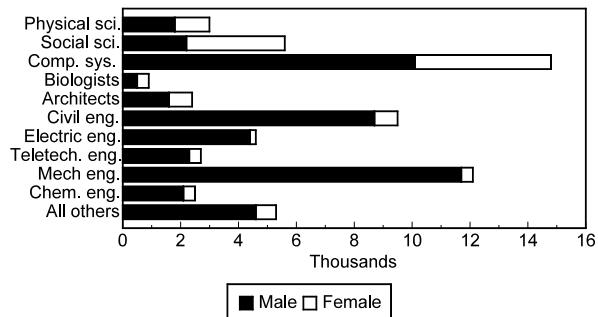
Within the employment category “Scientists and Engineers,”⁵ those specializing in computer systems analysis and mechanical engineering are most numerous. Males account for 81 percent of the 26,930 S/E in these fields which, including males and females, comprise 40 percent of S/E (Table FIN-1(93)). Among males, in addition to these professions, there are substantial numbers of civil and teletechnical engineers. Among females, there are large numbers of computer systems analysts and social scientists.

The overall distribution of scientists and engineers is dispersed less for males than females.⁶ While males account for most of employment across the different occupational categories, their majorities are greatest among the engineering professions (Figure 2). Overall, females account for 40 percent of all scientists (Table FIN-1(93)) but a far smaller share of engineers (Figure 3).

⁵See Table FIN-1(93) for a list of occupations that constitute the category, “scientists and engineers.”

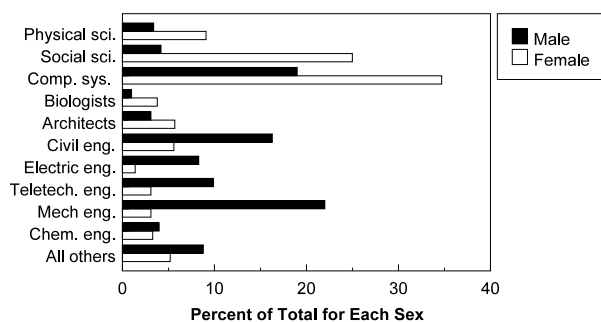
⁶The standard deviation among occupational categories for males is 6.99, compared with 8.37 for females.

Figure 2. Scientists and Engineers by Specialty and Sex: 1993



Source: Table FIN-1(93).

Figure 3. Distribution of Scientists and Engineers by Specialty and Sex: 1993



Source: Table FIN-1(93).

Scientists and engineers' age distribution is concentrated in the middle years.

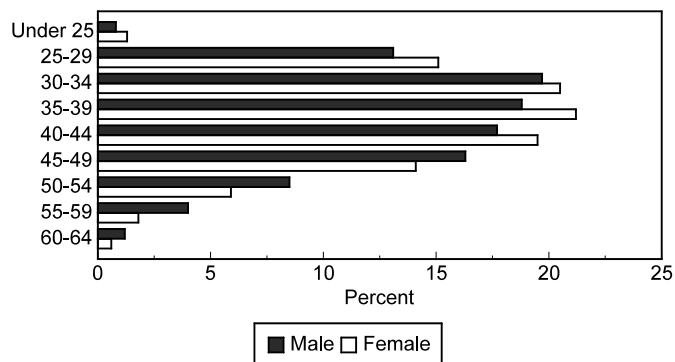
Scientists and engineers in Finland are older as a group than S/E in most other countries in this series. Finland has the second smallest share of its S/E population among the younger age groups of all the countries in this series.⁷ Just 34 percent of scientists and engineers are below age 35. Of these, few are under age 25, followed by larger numbers in the 25-29 and 30-34 age cohorts. The share of females under age 35 is similar to males (35 vs. 34 percent) (Table FIN-1(93); and Figure 4). Engineers in the teletechnical field have the highest share among the younger ages (52 percent), followed by computer system analysts (45 percent) (Table FIN-1(93) and Figure 5).

The distributions between younger and older workers are similar for both the overall labor force and scientists and engineers. In 1993, 37 percent of the Finnish labor force was below age 35, compared to 34 percent of S/E (Statistics Finland, 1995b, p. 52; and Table FIN-1(93)). However, measured by 5-year age cohorts, the S/E population features a more flat distribution than does the labor force.⁸

⁷Sweden has the lowest percentage, at 33 percent (Zaslow, 1997c, p. 6).

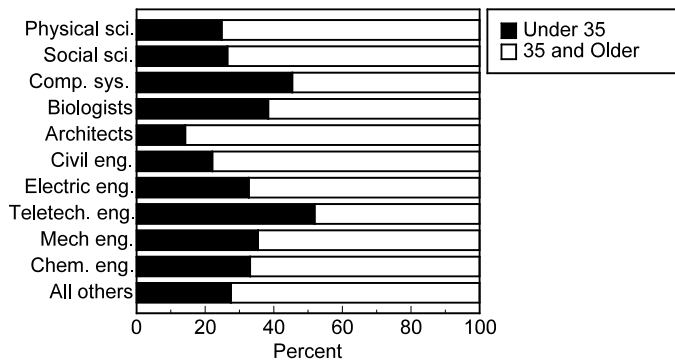
⁸The measure of kurtosis (relative peakedness or flatness of a distribution) of the S/E population, by 5-year age cohort, is -1.91 (suggesting a relatively flat distribution). By contrast, the kurtosis of the labor force is 1.102, implying a more peaked distribution.

Figure 4. Scientists and Engineers by Age and Sex: 1993



Source: Table FIN-1(93).

Figure 5. Scientists and Engineers by Age Group: 1993

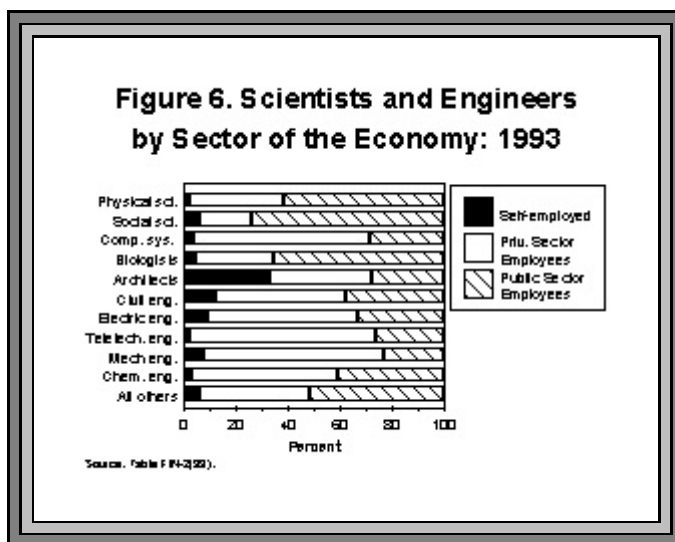


Source: Table FIN-1(93).

Nearly all scientists and engineers are employees.

Ninety-six percent of scientists and 91 percent of engineers are employees, as opposed to entrepreneurs.⁹ Meteorologists, hydrologists, and astronomers (as a single category); and economists, statisticians, and others engaged in research and planning (as a single category) each had the highest shares who were employees, at 99 percent (Table FIN-2(93)). As for the public/private sector split, most S/E (60 percent) work in the private sector.¹⁰ The share is even higher (68 percent) for the employed labor force (Statistics Finland, 1997a, p. 73). Within S/E employees, mechanical engineers and computer systems analysts have the highest shares of private sector employment, at 75 and 71 percent, respectively (Figure 6). Alternatively, meteorologists, hydrologists, and astronomers have the highest share of employees in the public sector (Table FIN-2(93)). Finally, sex affects the employment decision: males are represented more heavily than females in the private sector (63 to 49 percents, respectively) and are more likely to be entrepreneurs (8 to 5 percent).

The split between public and private sector employees closely mirrors the distribution in spending on research and development. Sixty percent of S/E worked in the private sector, which provided 58 percent of R&D funding in 1993 (excluding private universities). A close relationship between S/E and R&D spending is to be expected, since labor costs consumed 63 percent of R&D spending in 1993 (Statistics Finland, 1996b, pp. 458, 459).



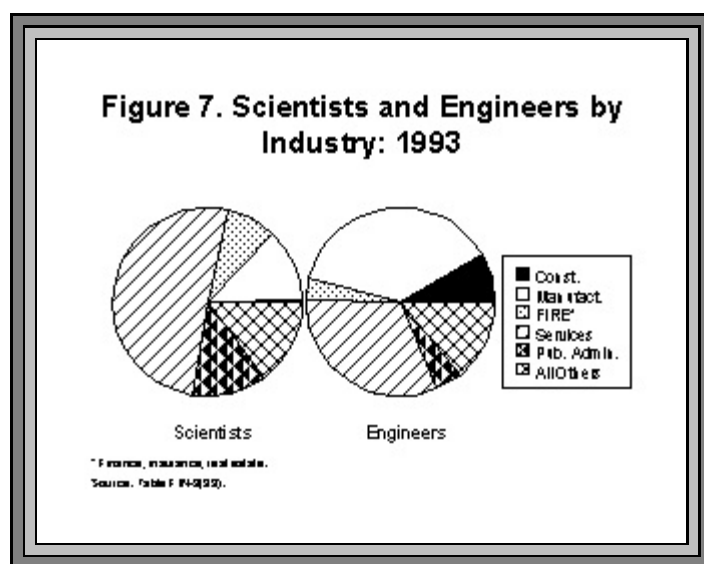
⁹This is higher than employees' share of the national employed population. In 1993, employees accounted for 85 percent of employed people (Statistics Finland, 1997a, p. 75).

¹⁰The private sector includes all self-employed S/E, as well as employees in the private sector.

The services and manufacturing industries dominate employment of scientists and engineers.

The services and manufacturing industries employ 63 percent of scientists and 69 percent of engineers¹¹ (Table FIN-3(93) and Figure 7). Engineers comprise a slight majority of S/E in services, and a substantial majority in manufacturing. Both scientists and engineers are dispersed widely among several industrial sectors.¹² At 67 percent, Finland's share of scientists and engineers in these two industrial sectors closely mirrors that found in the United States and Japan (70 and 68 percent, respectively) (National Science Board, 1993, p. 326; and Zaslow, 1996b, p. 21).

Comparisons of distributions of gross domestic product (GDP) and value-added shares by sector of origin and S/E employment shares did not produce direct, one-to-one relationships. In 1993, services and manufacturing generated one-third of Finnish GDP while employing two-thirds of S/E (Statistics Finland, 1996b, p. 273). The correlation coefficient between the sectoral breakdown of S/E and GDP is in the middle of the potential range of zero to one (.49), while the correlation between value added (for all sectors listed in Table FIN-3(93) except public administration and "undefined") and S/E is .43 (Statistics Finland, 1996a, pp. 22, 23).

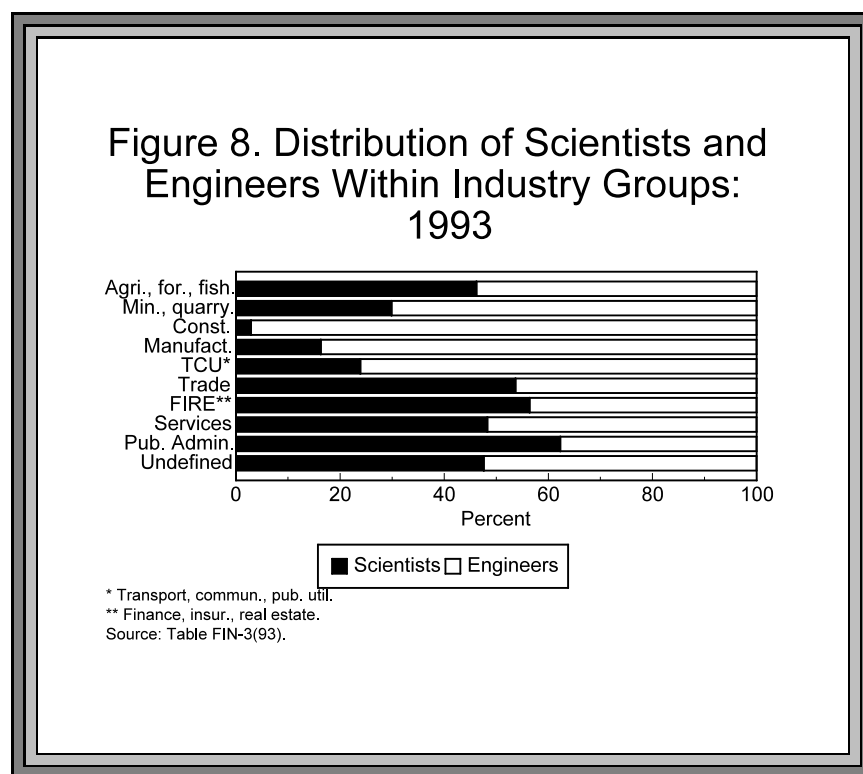


¹¹However, there are slightly more scientists employed in public administration than in manufacturing.

¹²Two measures which quantify concentration are the Herfindahl-Hirschman Index (H Index) (the concentration of market shares held by particular suppliers) and the coefficient of variation (the standard deviation divided by the mean). The H Indexes for both scientists and engineers are rather low, at .30 and .26, respectively (there is no threshold for significant concentration). The coefficients of variation are 1.51 and 1.33.

Many industries prefer neither scientists nor engineers.

While some industries in Finland (including manufacturing, the second largest employer of S/E) show a marked preference for hiring either scientists or engineers, Finland is unique among the countries in the series in that most industrial sectors' S/E are split fairly evenly between the two occupational groups (Figure 8).¹³ Where imbalances exist, engineers dominate. Construction has the most pronounced imbalance, with engineers comprising 97 percent of S/E (Table FIN-3(93)).



¹³While it would be desirable to establish whether the split between scientists and engineers across countries reflects differences in training and skills, or simply job titling, this is not possible as Britain is the only country in this series that lists occupational activities.

Employment of S/E is dispersed widely among manufacturing industries.

Employment of scientists and engineers is dispersed widely among the manufacturing industries (Table FIN-4(93); and Figure 9). The largest employer of S/E in manufacturing (electrical and optical equipment) employs just 29 percent of the group's S/E, while the average sector employs just 9 percent.¹⁴ The distribution of the largest industries (measured by value added) is a poor predictor of S/E employment. The correlation coefficient between the distribution of value added and manufacturing's S/E is .08 (Statistics Finland, 1996a, pp. 22, 23).

Despite the increased role of technologically-advanced sectors (such as electrical and optical equipment) in Finland's economy, traditional sectors such as forestry continue to be important¹⁵ and employ large numbers of S/E. In fact, the 9.3 percent of manufacturing industry S/E in pulp, paper and printing is equal to the all manufacturing average (Table FIN-4(93)).¹⁶

Finland's advance in science and technology has been broad-based, encompassing newly emerging sectors and traditionally important sectors. The country's electronics industry grew substantially in recent years. Its share of Finnish exports rose from 2 to 20 percent between 1980 and 1995, a level that is significant within the context of the country but does not make Finland a world leader in quantities of high-technology exports (VTT Energy, 1997, p. 2; and Finland Ministry of Foreign Affairs, 1997b, pp. 1, 3). Finland has a well-developed telecommunications sector. The country has the highest per-capita concentration of cellular phones (equal to levels of Australia and Sweden) (Figure 10; Finland Ministry of Foreign Affairs, 1997a, p. 1; and Paltridge and Ypsilanti, 1997, p. 20).¹⁷ Finland also has translated its traditional strength in forestry into a leading position in producing forestry equipment for domestic and export markets (Pease, 1992, p. 2).

Perhaps the main reason Finland has increased its share of high-technology exports is the substantial increase in R&D funding. Research and development spending as a share of GDP nearly doubled since the early 1980s (Statistics Finland, 1996b, p.

¹⁴The Herfindahl-Hirschman Indexes for both scientists and engineers are .20 and the coefficients of variation are 1.12 and 1.10, respectively.

¹⁵Wood and paper products accounted for 35 percent of Finnish exports in 1995 (Statistics Finland, 1995a, p. 1).

¹⁶The basic metals sector, as indicated below, is an important source of exports for Finland.

¹⁷The Finnish company, Nokia, is a leading world producer of cellular phones. Finland's leading position in communications was reached despite having (according to at least one measure) a slightly lower standard of living than the United States (Penn World Tables 5.6, 1997, p. 1).

459; and Kuusi, 1986, p. 91). As a result, Finland's R&D spending is nearly equal to U.S. levels, relative to GDP (Figure 11). Businesses do most R&D spending (Figure 12), with smaller shares for government and academe (Statistics Finland, 1996b, p. 459). European research consortia also fund a small portion of R&D (Allen, 1991, p. 9).¹⁸ For instance, the European Union's Joule-Thermie research program channeled three percent of its resources to Finland to develop energy-related technologies (VTT Energy, 1997, p. 2). Finland's ability to expand both high-technology exports and highly-productive processing sectors (such as wood-related industries) could help reduce the country's severe unemployment (18 percent in mid-1996) while stimulating demand for many of the country's other products (*Financial Times*, 1996, p. 2).

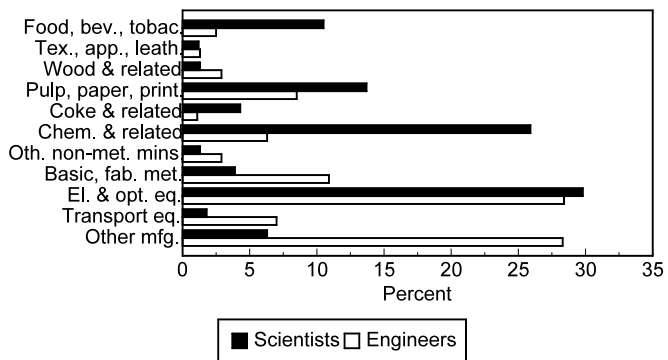
The timing of Finland's increase in R&D spending was fortunate, as the country's export patterns have shifted from an entrenched position in trade with the former Soviet Union to more competitive markets in Europe and Asia. For much of the postwar period, Finland bartered manufactured products (primarily textiles, clothing and leather products, and engineering goods) with the former Soviet Union in exchange for Soviet oil and gas (Pease, 1992, p. 44; Central Intelligence Agency, 1997, p. 5; and Finland Ministry of Finance, 1991, p. 27). Improvements stemming from increased R&D helped Finnish products compete in the more demanding Eastern and Western European markets (also Southeast Asia). Such inroads became much more important after the collapse of the former Soviet Union in the early 1990s.¹⁹ The chemicals and basic metals, and the engineering industries reportedly have been most successful in finding new markets (Finland Ministry of Finance, 1991, pp. 18, 19, 27).²⁰

¹⁸Foreign governments provide less than two percent of Finland's R&D funds (Statistics Finland, 1996b, pp. 458, 459).

¹⁹The need to compete better in the West is highlighted by Finland's entry into the European Union in 1995.

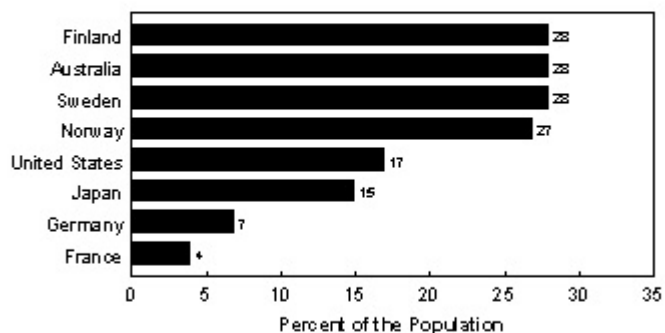
²⁰Currency devaluations during the early 1990s are a non-technological factor that reportedly has bolstered the competitiveness of Finland's exports (Central Intelligence Agency, 1997, p. 5).

Figure 9. Distribution of Scientists and Engineers in Manufacturing, by Industry: 1993



Source: Table FIN-4(93).

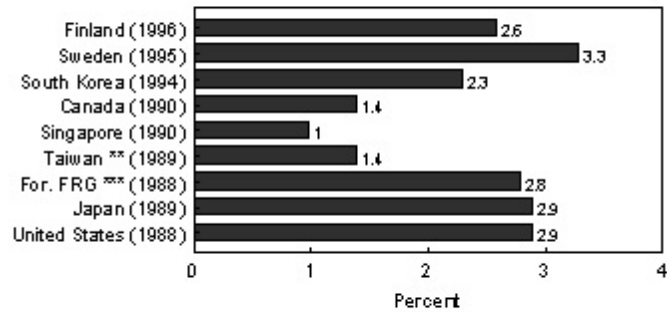
Figure 10. Ownership of Cellular Phones, by Country: 1996*



* Numbers rounded to nearest whole number.

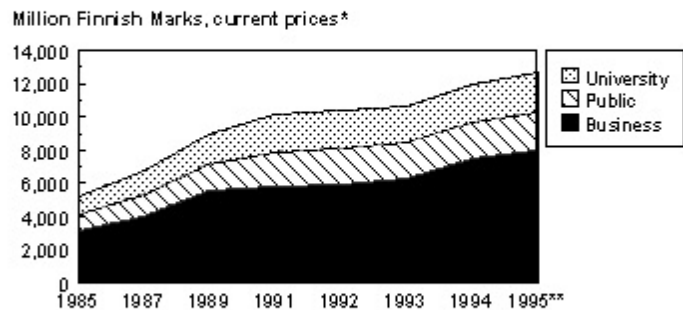
Source: Finland Ministry of Foreign Affairs, 1997a, p. 1.

Figure 11. Share of Gross Domestic Product Used for R&D*



* Research and Development; ** Share of GNP
 *** Federal Republic of Germany
 Source: Finland Ministry of Foreign Affairs, 1997b, p. 2; Zastrow, 1997c, p. 8.

Figure 12. Research and Development Spending by Sector: 1985-95

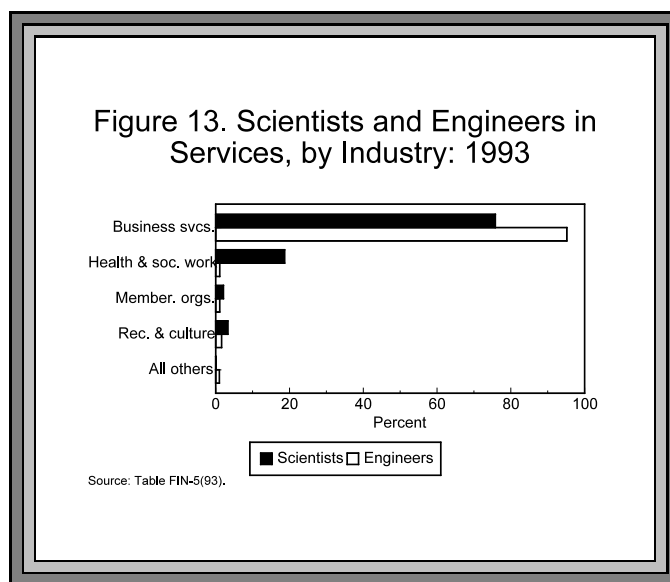


* There are roughly 5.2 FM to the dollar.
 ** Estimate.
 Source: Ce site, 1997b, p. 6.

The vast majority of service sector scientists and engineers work in business services.

A substantial majority of service sector scientists and engineers (86 percent) provide business services. Most of the remaining S/E are in health and social work (Table FIN-5(93)). Scientists are distributed slightly more evenly among the the service industries than are engineers (Figure 13).²¹ The remaining service sectors (besides business services) employ minor shares of scientists and engineers. Sex selection/role modeling appears to affect the service sector groups in which a scientist or engineer works. Among service sector scientists and engineers, 92 percent of males are in business services, compared with 69 percent of females (Table FIN-5(93)).

As for sectoral concentration, the pattern of employment among Finnish scientists in services is similar to that found in Japan.²² For engineers, Finland has the highest concentration among the countries in this series, with Canada's .81 being the next highest.²³ Measured in terms of the coefficient of variation, Finland's 2.25 for scientists and 2.84 for engineers most closely match that of Japan (Zaslow, 1996b, p. 27).²⁴



²¹The skew for engineers is 2.235894, compared to 1.966295 for scientists. The Herfindahl-Hirschman indexes for scientists and engineers are .61 and .91, respectively.

²²Similar shares of scientists in services are concentrated in business services for Finland and Japan, 76 and 78 percent, respectively (Zaslow, 1996b, p. 27). The Herfindahl-Hirschman Indexes for Finland and Japan are .61 and .65, respectively.

²³A higher share of engineers in Finland are in business services than in Canada (96 versus 89 percent, respectively) (Zaslow, 1996a, p. 33).

²⁴The coefficients of variation for S/E in Japan are 2.18 and 2.35.

Most scientists and engineers report either a vocational or a master's degree as their highest level of educational attainment.

A vocational degree is reported most frequently as the highest level of educational attainment among scientists and engineers in Finland (46 percent), followed by those reporting a master's degree as their highest level of education (36 percent--77 percent of those having earned any college degree) (Figure 14).²⁵ Considering the large shares of S/E at both levels of attainment, it would appear that a specific degree is not a prerequisite for entry into the S/E fields. Fifty-five percent of scientists and 41 percent of engineers have college degrees, while 92 percent of scientists and engineers have gone beyond high school (Table FIN-6(93)).

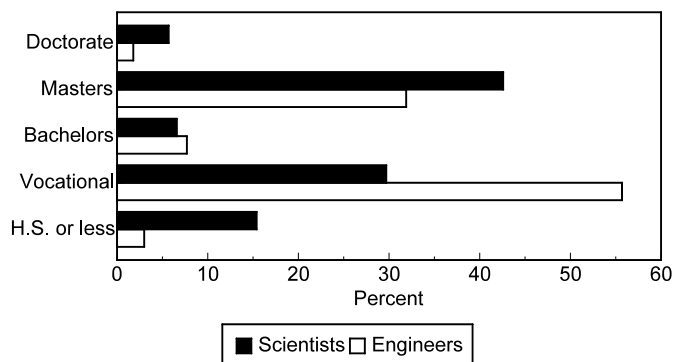
Scientists and engineers' educational levels reflect targets for Finnish national educational policy. Since the early 1980s, emphasis has been placed on making vocational or (tuition-free) higher education universally available (Karlsson and Herranen, 1997, pp. 2, 6). However, this goal is far from being met, as in 1993, 11 percent of the national population aged 15 and older had a higher education and 42 percent had an upper secondary school education (Statistics Finland, 1995d, p. 450). Among those in the labor force, the shares are marginally higher, with 15 percent having a higher education and 52 percent having upper secondary education (Statistics Finland, 1997a, p. 21).

Among the countries in this series, Finland, at 46 percent, is in the mid-range regarding scientists and engineers who have earned at least a 4-year degree. Finland's share is similar to that of Japan (48 percent) (Zaslow, 1996b, p. 30). Finland's share of S/E with more than a high school degree exceeds that of most countries in this series (South Korea's 99.8 being the only higher share) (Zaslow, 1997b, p. 31). Perhaps the most relevant comparison shows that Finland's S/E are educated more highly than those of neighboring Sweden. Just 55 percent of Sweden's S/E have a degree above high school;²⁶ 30 percent have a 4-year degree; and few Swedish S/E have graduate degrees (Zaslow, 1997c, p. 34).

²⁵Finnish S/E's high proportion of master's degrees likely will decline since, until recently, a master's degree could be earned without earning a bachelor's degree, which traditionally have not been offered. The 1997-1998 school year will be the first in which a bachelor's degree can be earned in any academic subject (Karlsson and Herranen, 1997, p. 6).

²⁶This includes junior college, higher professional schools, bachelor's, master's and doctoral degrees (Zaslow, 1997c, p. 34).

Figure 14. Scientists and Engineers by Educational Attainment: 1993



Source: Table FIN-6(93).

Conclusions

Finland's concentration of scientists and engineers in its economically active population lies in the mid-range of the countries in this series. The age structure of Finland's scientists and engineers is skewed slightly more toward younger age groups than is the country's overall labor force. Males predominate among scientists and engineers, accounting for 80 percent of S/E. In this respect, Finland's sex distribution most closely resembles those of Australia and Canada (where males account for 81 percent of S/E). Finland's scientist and engineer sex distribution contrasts sharply with that of its labor force and economically active population. The split for both is 53-47, male to female. Female scientists and engineers are concentrated more in the youngest age groups than are males and are far more heavily concentrated in the sciences.

Tables²⁷

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²⁷The letters “nec” in some of the occupational listings signifies categories that are “not elsewhere classified.”

FIN-1(93)

Table 1. Scientists and Engineers by Age and Sex, for Finland: 1993*

Occupation	Total											Both
		Under	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Sexes Median age
SCIENTISTS AND ENGINEERS	66,762	620	9,023	13,244	12,863	12,046	10,563	5,324	2,381	698	0	39
SCIENTISTS	24,533	291	3,656	5,420	4,843	4,629	3,594	1,510	447	143	0	37
Physical Scientists	3,055	10	244	504	670	558	553	353	114	49	0	40
Chemists	1,866	9	155	322	392	344	354	205	61	24	0	40
Physicists	539	0	40	86	140	92	85	62	21	13	0	40
Geologists	481	1	33	67	108	93	85	66	20	8	0	41
Meteorologists, hydrologists and astronomers	169	0	16	29	30	29	29	20	12	4	0	41
Social Scientists	5,627	36	536	918	948	1,206	1,207	539	164	73	0	41
Economists, statisticians and others engaged in research and planning	3,165	25	363	558	527	667	642	261	89	33	0	41
Psychologists	2,462	11	173	360	421	539	565	278	75	40	0	42
Computer system analysts	14,823	231	2,743	3,750	2,988	2,686	1,693	562	155	15	0	36
Biologists	1,028	14	133	248	237	179	141	56	14	6	0	37
ENGINEERS	42,229	329	5,367	7,824	8,020	7,417	6,969	3,814	1,934	555	0	39
Architects	2,393	7	96	236	399	499	476	340	243	97	0	44
Civil engineers	9,441	33	725	1,324	1,725	1,882	1,947	1,105	552	148	0	42
Electrical engineers	4,623	38	622	851	872	837	781	334	216	72	0	39
Engineers in the teletechnical field	5,719	124	1,445	1,402	1,090	736	547	250	98	27	0	34
Mechanical engineers	12,107	86	1,640	2,561	2,408	2,044	1,869	958	442	99	0	38
Chemical engineers	2,554	20	323	503	448	371	426	312	128	23	0	39
Mining and metallurgical engineers	434	1	33	62	69	95	90	53	26	5	0	42
Engineer surveyors	623	2	50	71	133	108	110	77	49	23	0	43
Engineers n.e.c.	4,335	18	433	814	876	845	723	385	180	61	0	40

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Table 1. Scientists and Engineers by Age and Sex, for Finland: 1993--Continued*

Occupation	Total											Male
		Under	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Median age
SCIENTISTS AND ENGINEERS	53,216	442	6,973	10,464	9,997	9,408	8,653	4,519	2,141	619	0	39
SCIENTISTS	14,694	181	2,247	3,389	2,919	2,675	2,063	867	266	87	0	37
Physical Scientists	1,824	6	121	254	385	344	348	246	80	40	0	42
Chemists	864	5	57	128	165	157	181	120	35	16	0	42
Physicists	453	0	31	68	112	82	77	52	19	12	0	40
Geologists	397	1	23	42	90	80	74	62	17	8	0	42
Meteorologists, hydrologists and astronomers	110	0	10	16	18	25	16	12	9	4	0	41
Social Scientists	2,235	11	207	366	383	473	486	207	68	34	0	41
Economists, statisticians and others engaged in research and planning	1,710	11	188	289	283	344	370	150	54	21	0	41
Psychologists	525	0	19	77	100	129	116	57	14	13	0	42
Computer system analysts	10,121	160	1,873	2,647	2,034	1,764	1,152	376	106	9	0	35
Biologists	514	4	46	122	117	94	77	38	12	4	0	38
ENGINEERS	38,522	261	4,726	7,075	7,078	6,733	6,590	3,652	1,875	532	0	40
Architects	1,628	3	53	150	243	323	328	247	202	79	0	45
Civil engineers	8,685	30	612	1,212	1,498	1,691	1,862	1,086	548	146	0	43
Electrical engineers	4,430	34	571	809	815	816	769	328	216	72	0	39
Engineers in the teletechnical field	5,293	101	1,307	1,295	1,007	683	531	246	96	27	0	34
Mechanical engineers	11,686	71	1,561	2,443	2,286	1,994	1,842	950	440	99	0	38
Chemical engineers	2,105	10	221	376	354	312	386	301	124	21	0	41
Mining and metallurgical engineers	397	1	27	53	57	89	87	52	26	5	0	43
Engineer surveyors	544	2	36	57	94	99	108	76	49	23	0	44
Engineers n.e.c.	3,754	9	338	680	724	726	677	366	174	60	0	40

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Table 1. Scientists and Engineers by Age and Sex, for Finland: 1993--Continued*

Occupation	Total											Female
		Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Median age
SCIENTISTS AND ENGINEERS	13,546	178	2,050	2,780	2,866	2,638	1,910	805	240	79	0	38
SCIENTISTS	9,839	110	1,409	2,031	1,924	1,954	1,531	643	181	56	0	38
Physical Scientists	1,231	4	123	250	285	214	205	107	34	9	0	39
Chemists	1,002	4	98	194	227	187	173	85	26	8	0	39
Physicists	86	0	9	18	28	10	8	10	2	1	0	37
Geologists	84	0	10	25	18	13	11	4	3	0	0	37
Meteorologists, hydrologists and astronomers	59	0	6	13	12	4	13	8	3	0	0	39
Social Scientists	3,392	25	329	552	565	733	721	332	96	39	0	41
Economists, statisticians and others engaged in research and planning	1,455	14	175	269	244	323	272	111	35	12	0	40
Psychologists	1,937	11	154	283	321	410	449	221	61	27	0	42
Computer system analysts	4,702	71	870	1,103	954	922	541	186	49	6	0	36
Biologists	514	10	87	126	120	85	64	18	2	2	0	36
ENGINEERS	3,707	68	641	749	942	684	379	162	59	23	0	37
Architects	765	4	43	86	156	176	148	93	41	18	0	42
Civil engineers	756	3	113	112	227	191	85	19	4	2	0	38
Electrical engineers	193	4	51	42	57	21	12	6	0	0	0	34
Engineers in the teletechnical field	426	23	138	107	83	53	16	4	2	0	0	32
Mechanical engineers	421	15	79	118	122	50	27	8	2	0	0	34
Chemical engineers	449	10	102	127	94	59	40	11	4	2	0	34
Mining and metallurgical engineers	37	0	6	9	12	6	3	1	0	0	0	36
Engineer surveyors	79	0	14	14	39	9	2	1	0	0	0	36
Engineers n.e.c.	581	9	95	134	152	119	46	19	6	1	0	37

* Due to an error committed by Statistics Finland, no data are recorded for those aged 65-74 (with those aged 75 and older normally excluded from labor force data). For the entire country, there were 5,337 workers aged 65-74.

Source:

Data derived from Regional Employment Statistics register, December 31, 1993.

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Table 2. Scientists and Engineers by Employment Status and Sex, for Finland: 1993

Occupation	Total	Self-employed (including employers)	Total Employees	Both Sexes	
				Public Sector	Private Sector
SCIENTISTS AND ENGINEERS	66,762	4,667	62,095	24,889	37,206
SCIENTISTS	24,533	919	23,614	10,936	12,678
Physical Scientists	3,055	63	2,992	1,883	1,109
Chemists	1,866	37	1,829	954	875
Physicists	539	12	527	369	158
Geologists	481	12	469	401	68
Meteorologists, hydrologists and astronomers	169	2	167	159	8
Social Scientists	5,627	347	5,280	4,162	1,118
Economists, statisticians and others engaged in research and planning	3,165	43	3,122	2,362	760
Psychologists	2,462	304	2,158	1,800	358
Computer system analysts	14,823	468	14,355	4,219	10,136
Biologists	1,028	41	987	672	315
ENGINEERS	42,229	3,748	38,481	13,953	24,528
Architects	2,393	777	1,616	665	951
Civil engineers	9,441	1,132	8,309	3,585	4,724
Electrical engineers	4,623	426	4,197	1,541	2,656
Engineers in the teletechnical field	5,719	135	5,584	1,497	4,087
Mechanical engineers	12,107	882	11,225	2,816	8,409
Chemical engineers	2,554	65	2,489	1,041	1,448
Mining and metallurgical engineers	434	12	422	294	128
Engineer surveyors	623	23	600	490	110
Engineers n.e.c.	4,335	296	4,039	2,024	2,015

FIN-2(93)

Table 2. Scientists and Engineers by Employment Status and Sex, for Finland:
1993--Continued

Occupation	Total	Self- employed (including employers)	Total Employees	Male	
				Public Sector	Private Sector
SCIENTISTS AND ENGINEERS	53,216	4,033	49,183	18,350	30,833
SCIENTISTS	14,694	555	14,139	5,889	8,250
Physical Scientists	1,824	44	1,780	1,190	590
Chemists	864	21	843	445	398
Physicists	453	10	443	314	129
Geologists	397	11	386	329	57
Meteorologists, hydrologists and astronomers	110	2	108	102	6
Social Scientists	2,235	94	2,141	1,632	509
Economists, statisticians and others engaged in research and planning	1,710	27	1,683	1,265	418
Psychologists	525	67	458	367	91
Computer system analysts	10,121	392	9,729	2,718	7,011
Biologists	514	25	489	349	140
ENGINEERS	38,522	3,478	35,044	12,461	22,583
Architects	1,628	614	1,014	381	633
Civil engineers	8,685	1,084	7,601	3,248	4,353
Electrical engineers	4,430	419	4,011	1,455	2,556
Engineers in the teletechnical field	5,293	130	5,163	1,384	3,779
Mechanical engineers	11,686	870	10,816	2,720	8,096
Chemical engineers	2,105	56	2,049	850	1,199
Mining and metallurgical engineers	397	12	385	264	121
Engineer surveyors	544	23	521	426	95
Engineers n.e.c.	3,754	270	3,484	1,733	1,751

Table 2. Scientists and Engineers by Employment Status and Sex, for Finland:
1993--Continued

Occupation	Total	Self- employed (including employers)	Total Employees	Female	
				Public Sector	Private Sector
SCIENTISTS AND ENGINEERS	13,546	634	12,912	6,539	6,373
SCIENTISTS	9,839	364	9,475	5,047	4,428
Physical Scientists	1,231	19	1,212	693	519
Chemists	1,002	16	986	509	477
Physicists	86	2	84	55	29
Geologists	84	1	83	72	11
Meteorologists, hydrologists and astronomers	59	0	59	57	2
Social Scientists	3,392	253	3,139	2,530	609
Economists, statisticians and others engaged in research and planning	1,455	16	1,439	1,097	342
Psychologists	1,937	237	1,700	1,433	267
Computer system analysts	4,702	76	4,626	1,501	3,125
Biologists	514	16	498	323	175
ENGINEERS	3,707	270	3,437	1,492	1,945
Architects	765	163	602	284	318
Civil engineers	756	48	708	337	371
Electrical engineers	193	7	186	86	100
Engineers in the teletechnical field	426	5	421	113	308
Mechanical engineers	421	12	409	96	313
Chemical engineers	449	9	440	191	249
Mining and metallurgical engineers	37	0	37	30	7
Engineer surveyors	79	0	79	64	15
Engineers n.e.c.	581	26	555	291	264

Source:

Data derived from Regional Employment Statistics register, December 31, 1993.

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Table 3. Scientists and Engineers by Industry and Sex, for Finland: 1993

Occupation	Total	Agri., forestry and fish.	Mining and quarry.	Constr.	Manufac- turing	Transport, commun. and pub. util.	Trade	Finance, insur., and real estate	Services	Public admin.	Both Sexes
											Un- defined
SCIENTISTS AND ENGINEERS	66,762	331	157	3,659	18,956	4,469	3,118	3,683	25,848	5,023	1,518
SCIENTISTS	24,533	153	47	105	3,083	1,066	1,673	2,076	12,479	3,128	723
Physical Scientists	3,055	28	32	6	924	64	96	21	1,585	206	93
Chemists	1,866	22	9	0	784	34	87	4	738	119	69
Physicists	539	2	1	0	125	24	6	1	324	39	17
Geologists	481	4	22	6	14	4	2	15	364	43	7
Meteorologists, hydrologists and astronomers	169	0	0	0	1	2	1	1	159	5	0
Social Scientists	5,627	20	0	8	137	174	70	303	3,028	1,653	234
Economists, statisticians and others engaged in research and planning	3,165	11	0	7	129	168	58	294	998	1,366	134
Psychologists	2,462	9	0	1	8	6	12	9	2,030	287	100
Computer system analysts	14,823	62	13	90	1,877	815	1,481	1,750	7,360	1,030	345
Biologists	1,028	43	2	1	145	13	26	2	506	239	51
ENGINEERS	42,229	178	110	3,554	15,873	3,403	1,445	1,607	13,369	1,895	795
Architects	2,393	12	0	19	39	36	20	95	1,808	292	72
Civil engineers	9,441	91	20	2,536	741	334	190	778	3,631	890	230
Electrical engineers	4,623	12	4	465	1,581	1,046	173	344	906	28	64
Engineers in the teletechnical field	5,719	6	1	35	3,045	1,100	345	33	1,014	80	60
Mechanical engineers	12,107	37	13	435	6,967	487	466	168	3,058	253	223
Chemical engineers	2,554	3	7	4	1,849	104	71	9	405	54	48
Mining and metallurgical engineers	434	2	52	5	226	5	12	4	123	0	5
Engineer surveyors	623	3	5	7	26	26	4	32	447	60	13
Engineers n.e.c.	4,335	12	8	48	1,399	265	164	144	1,977	238	80

FIN-3(93)

Table 3. Scientists and Engineers by Industry and Sex, for Finland:
1993--Continued

Male

Occupation	Total	Agri., forestry and fish.	Mining and quarry.	Constr.	Manufac- turing	Transport, commun. and pub. util.	Trade	Finance, insur., and real estate	Services	Public admin.	Un- defined
SCIENTISTS AND ENGINEERS	53,216	225	141	3,467	16,796	3,884	2,582	2,640	19,164	3,178	1,139
SCIENTISTS	14,694	75	38	73	2,024	709	1,239	1,179	7,285	1,641	431
Physical Scientists	1,824	12	27	5	509	45	43	13	1,003	120	47
Chemists	864	8	6	0	399	18	36	3	320	48	26
Physicists	453	1	1	0	96	22	5	0	279	34	15
Geologists	397	3	20	5	13	4	2	9	302	33	6
Meteorologists, hydrologists and astronomers	110	0	0	0	1	1	0	1	102	5	0
Social Scientists	2,235	5	0	5	66	103	29	184	963	784	96
Economists, statisticians and others engaged in research and planning	1,710	5	0	4	61	100	26	182	536	722	74
Psychologists	525	0	0	1	5	3	3	2	427	62	22
Computer system analysts	10,121	33	10	63	1,398	553	1,151	980	5,079	591	263
Biologists	514	25	1	0	51	8	16	2	240	146	25
ENGINEERS	38,522	150	103	3,394	14,772	3,175	1,343	1,461	11,879	1,537	708
Architects	1,628	5	0	11	29	21	11	58	1,285	155	53
Civil engineers	8,685	79	20	2,416	685	306	172	716	3,317	769	205
Electrical engineers	4,430	11	4	457	1,509	997	165	326	876	23	62
Engineers in the teletechnical field	5,293	3	1	31	2,805	1,013	326	30	952	73	59
Mechanical engineers	11,686	35	13	422	6,737	478	447	162	2,934	245	213
Chemical engineers	2,105	1	6	3	1,555	93	58	7	322	26	34
Mining and metallurgical engineers	397	2	46	5	211	5	12	3	108	0	5
Engineer surveyors	544	2	5	5	24	25	4	29	385	53	12
Engineers n.e.c.	3,754	12	8	44	1,217	237	148	130	1,700	193	65

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Table 3. Scientists and Engineers by Industry and Sex, for Finland: 1993--Continued

Occupation	Total	Agri., forestry and fish.	Mining and quarry.	Constr.	Manufac- turing	Transport, commun. and pub. util.	Trade	Finance, insur., and real estate	Services	Public admin.	Female Un- defined
SCIENTISTS AND ENGINEERS	13,546	106	16	192	2,160	585	536	1,043	6,684	1,845	379
SCIENTISTS	9,839	78	9	32	1,059	357	434	897	5,194	1,487	292
Physical Scientists	1,231	16	5	1	415	19	53	8	582	86	46
Chemists	1,002	14	3	0	385	16	51	1	418	71	43
Physicists	86	1	0	0	29	2	1	1	45	5	2
Geologists	84	1	2	1	1	0	0	6	62	10	1
Meteorologists, hydrologists and astronomers	59	0	0	0	0	1	1	0	57	0	0
Social Scientists	3,392	15	0	3	71	71	41	119	2,065	869	138
Economists, statisticians and others engaged in research and planning	1,455	6	0	3	68	68	32	112	462	644	60
Psychologists	1,937	9	0	0	3	3	9	7	1,603	225	78
Computer system analysts	4,702	29	3	27	479	262	330	770	2,281	439	82
Biologists	514	18	1	1	94	5	10	0	266	93	26
ENGINEERS	3,707	28	7	160	1,101	228	102	146	1,490	358	87
Architects	765	7	0	8	10	15	9	37	523	137	19
Civil engineers	756	12	0	120	56	28	18	62	314	121	25
Electrical engineers	193	1	0	8	72	49	8	18	30	5	2
Engineers in the teletechnical field	426	3	0	4	240	87	19	3	62	7	1
Mechanical engineers	421	2	0	13	230	9	19	6	124	8	10
Chemical engineers	449	2	1	1	294	11	13	2	83	28	14
Mining and metallurgical engineers	37	0	6	0	15	0	0	1	15	0	0
Engineer surveyors	79	1	0	2	2	1	0	3	62	7	1
Engineers n.e.c.	581	0	0	4	182	28	16	14	277	45	15

Source:

Data derived from Regional Employment Statistics register, December 31, 1993.

FIN-4(93)

Table 4. Scientists and Engineers by Manufacturing Industry and Sex, for Finland: 1993

Occupation	Total	Food, bev. and tobacco	Textile, app. and leather	Wood and wood prods.	Pulp, pap. and printing	Coke, ref. pet. and nucl. fuel	Chems., rub. and plastics	Other non-met. minerals	Basic and fab. metals	Elec. & optical equip.	Trans. equip.	Both Sexes
												Other mfg.
SCIENTISTS AND ENGINEERS	18,956	728	240	500	1,764	309	1,804	494	1,844	5,418	1,165	4,690
SCIENTISTS	3,083	325	37	41	422	134	799	41	119	918	54	193
Physical Scientists	924	105	8	6	57	32	549	14	26	109	3	15
Chemists	784	99	7	4	44	26	514	9	15	53	3	10
Physicists	125	6	1	2	10	3	35	2	7	54	0	5
Geologists	14	0	0	0	3	3	0	3	4	1	0	0
Meteorologists, hydrologists and astronomers	1	0	0	0	0	0	0	0	0	1	0	0
Social Scientists	137	30	1	1	38	8	15	1	9	17	5	12
Economists, statisticians and others engaged in research and planning	129	30	1	1	34	8	14	1	9	16	5	10
Psychologists	8	0	0	0	4	0	1	0	0	1	0	2
Computer system analysts	1,877	161	27	32	323	90	147	25	84	778	46	164
Biologists	145	29	1	2	4	4	88	1	0	14	0	2
ENGINEERS	15,873	403	203	459	1,342	175	1,005	453	1,725	4,500	1,111	4,497
Architects	39	5	0	7	11	0	3	4	2	2	2	3
Civil engineers	741	35	3	163	68	1	44	151	61	69	33	113
Electrical engineers	1,581	20	4	23	49	11	44	17	65	1,015	61	272
Engineers in the teletechnical field	3,045	7	1	3	25	5	32	4	24	2,802	27	115
Mechanical engineers	6,967	103	26	67	135	16	256	65	1,218	391	922	3,768
Chemical engineers	1,849	130	7	39	818	127	488	126	30	23	4	57
Mining and metallurgical engineers	226	0	0	3	0	0	14	5	184	3	4	13
Engineer surveyors	26	0	0	0	3	0	1	0	0	19	2	1
Engineers n.e.c.	1,399	103	162	154	233	15	123	81	141	176	56	155

FIN-4(93)

Table 4. Scientists and Engineers by Manufacturing Industry and Sex, for Finland: 1993--Continued

Occupation	Total	Food, bev. and tobacco	Textile, app. and leather	Wood and wood prods.	Pulp, pap. and printing	Coke, ref. pet. and nucl. fuel	Chems., rub. and plastics	Other non-met. minerals	Basic and fab. metals	Elec. & optical equip.	Trans. equip.	Male
												Other mfg.
SCIENTISTS AND ENGINEERS	16,796	480	159	450	1,511	231	1,284	437	1,722	4,892	1,115	4,515
SCIENTISTS	2,024	169	22	21	283	81	420	25	92	726	33	152
Physical Scientists	509	45	3	3	35	19	287	9	26	69	1	12
Chemists	399	44	2	1	27	14	265	5	15	18	1	7
Physicists	96	1	1	2	5	3	22	1	7	49	0	5
Geologists	13	0	0	0	3	2	0	3	4	1	0	0
Meteorologists, hydrologists and astronomers	1	0	0	0	0	0	0	0	0	1	0	0
Social Scientists	66	12	0	1	14	4	8	1	4	11	3	8
Economists, statisticians and others engaged in research and planning	61	12	0	1	11	4	8	1	4	11	3	6
Psychologists	5	0	0	0	3	0	0	0	0	0	0	2
Computer system analysts	1,398	103	19	16	232	55	96	15	62	640	29	131
Biologists	51	9	0	1	2	3	29	0	0	6	0	1
ENGINEERS	14,772	311	137	429	1,228	150	864	412	1,630	4,166	1,082	4,363
Architects	29	5	0	6	8	0	2	3	1	2	0	2
Civil engineers	685	32	3	151	60	1	40	137	58	64	33	106
Electrical engineers	1,509	20	4	21	48	10	43	17	62	959	60	265
Engineers in the teletechnical field	2,805	6	1	3	25	4	31	3	22	2,576	25	109
Mechanical engineers	6,737	99	20	67	127	16	245	63	1,156	371	900	3,673
Chemical engineers	1,555	72	4	33	751	104	382	111	26	18	3	51
Mining and metallurgical engineers	211	0	0	3	0	0	12	4	173	2	4	13
Engineer surveyors	24	0	0	0	3	0	1	0	0	17	2	1
Engineers n.e.c.	1,217	77	105	145	206	15	108	74	132	157	55	143

FIN-4(93)

Female

Table 4. Scientists and Engineers by Manufacturing Industry and Sex, for Finland: 1993--Continued

Occupation	Total	Food, bev. and tobacco	Textile, app. and leather	Wood and wood prods.	Pulp, pap. and printing	Coke, ref. pet. and nucl. fuel	Chems., rub. and plastics	Other non-met. minerals	Basic and fab. metals	Elec. & optical equip.	Trans. equip.	Other mfg.
SCIENTISTS AND ENGINEERS	2,160	248	81	50	253	78	520	57	122	526	50	175
SCIENTISTS	1,059	156	15	20	139	53	379	16	27	192	21	41
Physical Scientists	415	60	5	3	22	13	262	5	0	40	2	3
Chemists	385	55	5	3	17	12	249	4	0	35	2	3
Physicists	29	5	0	0	5	0	13	1	0	5	0	0
Geologists	1	0	0	0	0	1	0	0	0	0	0	0
Meteorologists, hydrologists and astronomers	0	0	0	0	0	0	0	0	0	0	0	0
Social Scientists	71	18	1	0	24	4	7	0	5	6	2	4
Economists, statisticians and others engaged in research and planning	68	18	1	0	23	4	6	0	5	5	2	4
Psychologists	3	0	0	0	1	0	1	0	0	1	0	0
Computer system analysts	479	58	8	16	91	35	51	10	22	138	17	33
Biologists	94	20	1	1	2	1	59	1	0	8	0	1
ENGINEERS	1,101	92	66	30	114	25	141	41	95	334	29	134
Architects	10	0	0	1	3	0	1	1	1	0	2	1
Civil engineers	56	3	0	12	8	0	4	14	3	5	0	7
Electrical engineers	72	0	0	2	1	1	1	0	3	56	1	7
Engineers in the teletechnical field	240	1	0	0	0	1	1	1	2	226	2	6
Mechanical engineers	230	4	6	0	8	0	11	2	62	20	22	95
Chemical engineers	294	58	3	6	67	23	106	15	4	5	1	6
Mining and metallurgical engineers	15	0	0	0	0	0	2	1	11	1	0	0
Engineer surveyors	2	0	0	0	0	0	0	0	0	2	0	0
Engineers n.e.c.	182	26	57	9	27	0	15	7	9	19	1	12

Source:

Data derived from Regional Employment Statistics register, December 31, 1993.

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Table 5. Scientists and Engineers by Service Industry and Sex, for Finland: 1993

Occupation	Total	Business services	Hotels & camping sites	Auto repair	Repair of personal & household goods	Health and social work	Membership organs.	Recreation and culture	Private households	Other svcs.	Both Sexes
SCIENTISTS AND ENGINEERS	25,848	22,183	21	117	5	2,474	403	623	1	21	
SCIENTISTS	12,479	9,462	8	8	1	2,330	256	409	0	5	
Physical Scientists	1,585	1,263	0	0	0	294	17	10	0	1	
Chemists	738	491	0	0	0	233	11	3	0	0	
Physicists	324	258	0	0	0	61	2	3	0	0	
Geologists	364	359	0	0	0	0	4	1	0	0	
Meteorologists, hydrologists and astronomers	159	155	0	0	0	0	0	3	0	1	
Social Scientists	3,028	846	6	0	0	1,785	162	226	0	3	
Economists, statisticians and others engaged in research and planning	998	492	2	0	0	133	148	223	0	0	
Psychologists	2,030	354	4	0	0	1,652	14	3	0	3	
Computer system analysts	7,360	6,954	2	8	1	186	49	159	0	1	
Biologists	506	399	0	0	0	65	28	14	0	0	
ENGINEERS	13,369	12,721	13	109	4	144	147	214	1	16	
Architects	1,808	1,784	0	0	0	5	8	11	0	0	
Civil engineers	3,631	3,517	4	9	1	32	43	24	0	1	
Electrical engineers	906	863	2	2	0	12	12	14	0	1	
Engineers in the teletechnical field	1,014	887	1	4	2	10	2	107	0	1	
Mechanical engineers	3,058	2,883	1	89	1	20	33	26	1	4	
Chemical engineers	405	393	0	0	0	4	7	0	0	1	
Mining and metallurgical engineers	123	122	0	0	0	0	0	1	0	0	
Engineer surveyors	447	444	0	0	0	0	1	1	0	1	
Engineers n.e.c.	1,977	1,828	5	5	0	61	41	30	0	7	

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Table 5. Scientists and Engineers by Service Industry and Sex, for Finland:
1993--Continued

Male

Occupation	Total	Business services	Hotels & camping sites	Auto repair	Repair of personal & household goods	Health and social work	Membership organs.	Recreation and culture	Private households	Other svcs.
SCIENTISTS AND ENGINEERS	19,164	17,553	15	114	5	756	275	432	1	13
SCIENTISTS	7,285	6,251	5	6	1	632	150	237	0	3
Physical Scientists	1,003	849	0	0	0	139	7	7	0	1
Chemists	320	232	0	0	0	85	2	1	0	0
Physicists	279	220	0	0	0	54	2	3	0	0
Geologists	302	298	0	0	0	0	3	1	0	0
Meteorologists, hydrologists and astronomers	102	99	0	0	0	0	0	2	0	1
Social Scientists	963	378	4	0	0	373	98	109	0	1
Economists, statisticians and others engaged in research and planning	536	283	2	0	0	49	95	107	0	0
Psychologists	427	95	2	0	0	324	3	2	0	1
Computer system analysts	5,079	4,824	1	6	1	100	32	114	0	1
Biologists	240	200	0	0	0	20	13	7	0	0
ENGINEERS	11,879	11,302	10	108	4	124	125	195	1	10
Architects	1,285	1,275	0	0	0	1	5	4	0	0
Civil engineers	3,317	3,217	3	9	1	29	35	22	0	1
Electrical engineers	876	836	2	2	0	11	10	14	0	1
Engineers in the teletechnical field	952	832	0	4	2	9	2	103	0	0
Mechanical engineers	2,934	2,769	1	89	1	16	30	24	1	3
Chemical engineers	322	313	0	0	0	4	4	0	0	1
Mining and metallurgical engineers	108	107	0	0	0	0	0	1	0	0
Engineer surveyors	385	382	0	0	0	0	1	1	0	1
Engineers n.e.c.	1,700	1,571	4	4	0	54	38	26	0	3

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Table 5. Scientists and Engineers by Service Industry and Sex, for Finland:

1993--Continued

Female

Occupation	Total	Business services	Hotels & camping sites	Auto repair	Repair of personal & household goods	Health and social work	Membership organs.	Recreation and culture	Private households	Other svcs.
SCIENTISTS AND ENGINEERS	6,684	4,630	6	3	0	1,718	128	191	0	8
SCIENTISTS	5,194	3,211	3	2	0	1,698	106	172	0	2
Physical Scientists	582	414	0	0	0	155	10	3	0	0
Chemists	418	259	0	0	0	148	9	2	0	0
Physicists	45	38	0	0	0	7	0	0	0	0
Geologists	62	61	0	0	0	0	1	0	0	0
Meteorologists, hydrologists and astronomers	57	56	0	0	0	0	0	1	0	0
Social Scientists	2,065	468	2	0	0	1,412	64	117	0	2
Economists, statisticians and others engaged in research and planning	462	209	0	0	0	84	53	116	0	0
Psychologists	1,603	259	2	0	0	1,328	11	1	0	2
Computer system analysts	2,281	2,130	1	2	0	86	17	45	0	0
Biologists	266	199	0	0	0	45	15	7	0	0
ENGINEERS	1,490	1,419	3	1	0	20	22	19	0	6
Architects	523	509	0	0	0	4	3	7	0	0
Civil engineers	314	300	1	0	0	3	8	2	0	0
Electrical engineers	30	27	0	0	0	1	2	0	0	0
Engineers in the teletechnical field	62	55	1	0	0	1	0	4	0	1
Mechanical engineers	124	114	0	0	0	4	3	2	0	1
Chemical engineers	83	80	0	0	0	0	3	0	0	0
Mining and metallurgical engineers	15	15	0	0	0	0	0	0	0	0
Engineer surveyors	62	62	0	0	0	0	0	0	0	0
Engineers n.e.c.	277	257	1	1	0	7	3	4	0	4

Source:

Data derived from Regional Employment Statistics register, December 31, 1993.

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Table 6. Scientists and Engineers by Educational Attainment and Sex, for Finland: 1993

Occupation	Total	Doctorate	Master's	Bachelor's	Vocational	Both Sexes
						High School or less
SCIENTISTS AND ENGINEERS	66,762	2,153	23,922	4,858	30,792	5,037
SCIENTISTS	24,533	1,392	10,463	1,618	7,283	3,777
Physical Scientists	3,055	649	2,166	75	61	104
Chemists	1,866	337	1,423	30	35	41
Physicists	539	163	348	8	15	5
Geologists	481	134	317	18	1	11
Meteorologists, hydrologists and astronomers	169	15	78	19	10	47
Social Scientists	5,627	405	4,259	346	318	299
Economists, statisticians and others engaged in research and planning	3,165	304	2,111	254	273	223
Psychologists	2,462	101	2,148	92	45	76
Computer system analysts	14,823	88	3,344	1,177	6,879	3,335
Biologists	1,028	250	694	20	25	39
ENGINEERS	42,229	761	13,459	3,240	23,509	1,260
Architects	2,393	27	1,463	53	707	143
Civil engineers	9,441	71	2,092	551	6,443	284
Electrical engineers	4,623	49	1,138	371	2,969	96
Engineers in the teletechnical field	5,719	90	1,826	856	2,696	251
Mechanical engineers	12,107	90	2,745	1,018	7,934	320
Chemical engineers	2,554	57	1,319	129	1,011	38
Mining and metallurgical engineers	434	40	285	5	101	3
Engineer surveyors	623	12	541	21	36	13
Engineers n.e.c.	4,335	325	2,050	236	1,612	112

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Table 6. Scientists and Engineers by Educational Attainment and Sex, for Finland: 1993--Continued

Occupation	Total	Doctorate	Master's	Bachelor's	Vocational	Male High School or less
SCIENTISTS AND ENGINEERS	53,216	1,627	17,194	3,849	26,697	3,849
SCIENTISTS	14,694	938	5,571	884	4,574	2,727
Physical Scientists	1,824	468	1,203	46	41	66
Chemists	864	192	614	11	23	24
Physicists	453	143	284	7	14	5
Geologists	397	120	249	16	1	11
Meteorologists, hydrologists and astronomers	110	13	56	12	3	26
Social Scientists	2,235	252	1,572	140	142	129
Economists, statisticians and others engaged in research and planning	1,710	215	1,129	124	132	110
Psychologists	525	37	443	16	10	19
Computer system analysts	10,121	77	2,469	684	4,381	2,510
Biologists	514	141	327	14	10	22
ENGINEERS	38,522	689	11,623	2,965	22,123	1,122
Architects	1,628	20	1,001	34	470	103
Civil engineers	8,685	66	1,881	488	5,994	256
Electrical engineers	4,430	47	1,061	347	2,886	89
Engineers in the teletechnical field	5,293	86	1,673	786	2,519	229
Mechanical engineers	11,686	87	2,586	979	7,740	294
Chemical engineers	2,105	43	1,023	104	900	35
Mining and metallurgical engineers	397	39	253	5	97	3
Engineer surveyors	544	12	465	21	35	11
Engineers n.e.c.	3,754	289	1,680	201	1,482	102

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Table 6. Scientists and Engineers by Educational Attainment and Sex, for Finland: 1993--
Continued

Occupation	Total	Doctorate	Master's	Bachelor's	Vocational	Female High School or less
SCIENTISTS AND ENGINEERS	13,546	526	6,728	1,009	4,095	1,188
SCIENTISTS	9,839	454	4,892	734	2,709	1,050
Physical Scientists	1,231	181	963	29	20	38
Chemists	1,002	145	809	19	12	17
Physicists	86	20	64	1	1	0
Geologists	84	14	68	2	0	0
Meteorologists, hydrologists and astronomers	59	2	22	7	7	21
Social Scientists	3,392	153	2,687	206	176	170
Economists, statisticians and others engaged in research and planning	1,455	89	982	130	141	113
Psychologists	1,937	64	1,705	76	35	57
Computer system analysts	4,702	11	875	493	2,498	825
Biologists	514	109	367	6	15	17
ENGINEERS	3,707	72	1,836	275	1,386	138
Architects	765	7	462	19	237	40
Civil engineers	756	5	211	63	449	28
Electrical engineers	193	2	77	24	83	7
Engineers in the teletechnical field	426	4	153	70	177	22
Mechanical engineers	421	3	159	39	194	26
Chemical engineers	449	14	296	25	111	3
Mining and metallurgical engineers	37	1	32	0	4	0
Engineer surveyors	79	0	76	0	1	2
Engineers n.e.c.	581	36	370	35	130	10

Source:

Data derived from Regional Employment Statistics register, December 31, 1993.

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