

SCIENTISTS AND ENGINEERS IN SWEDEN: 1990

by

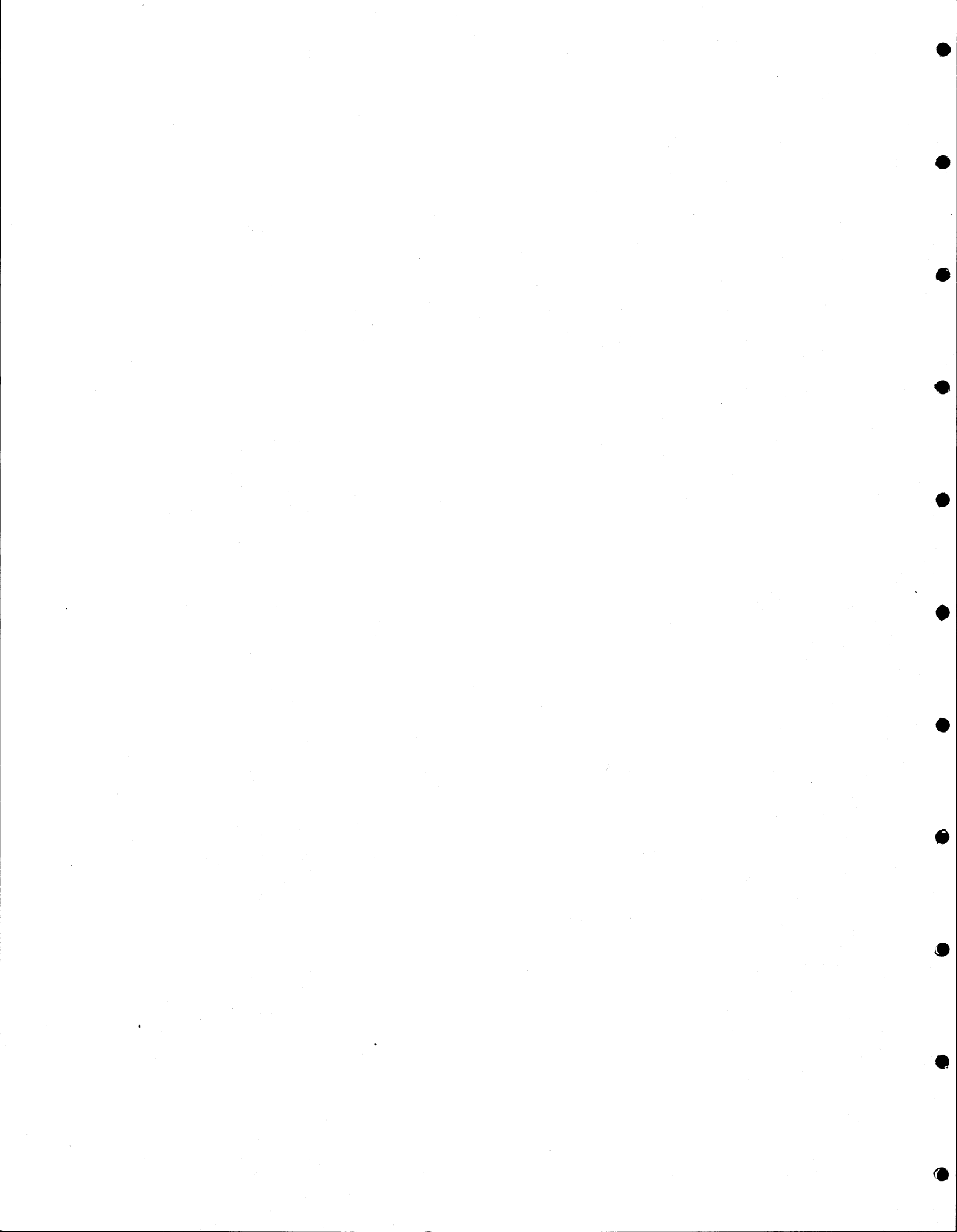
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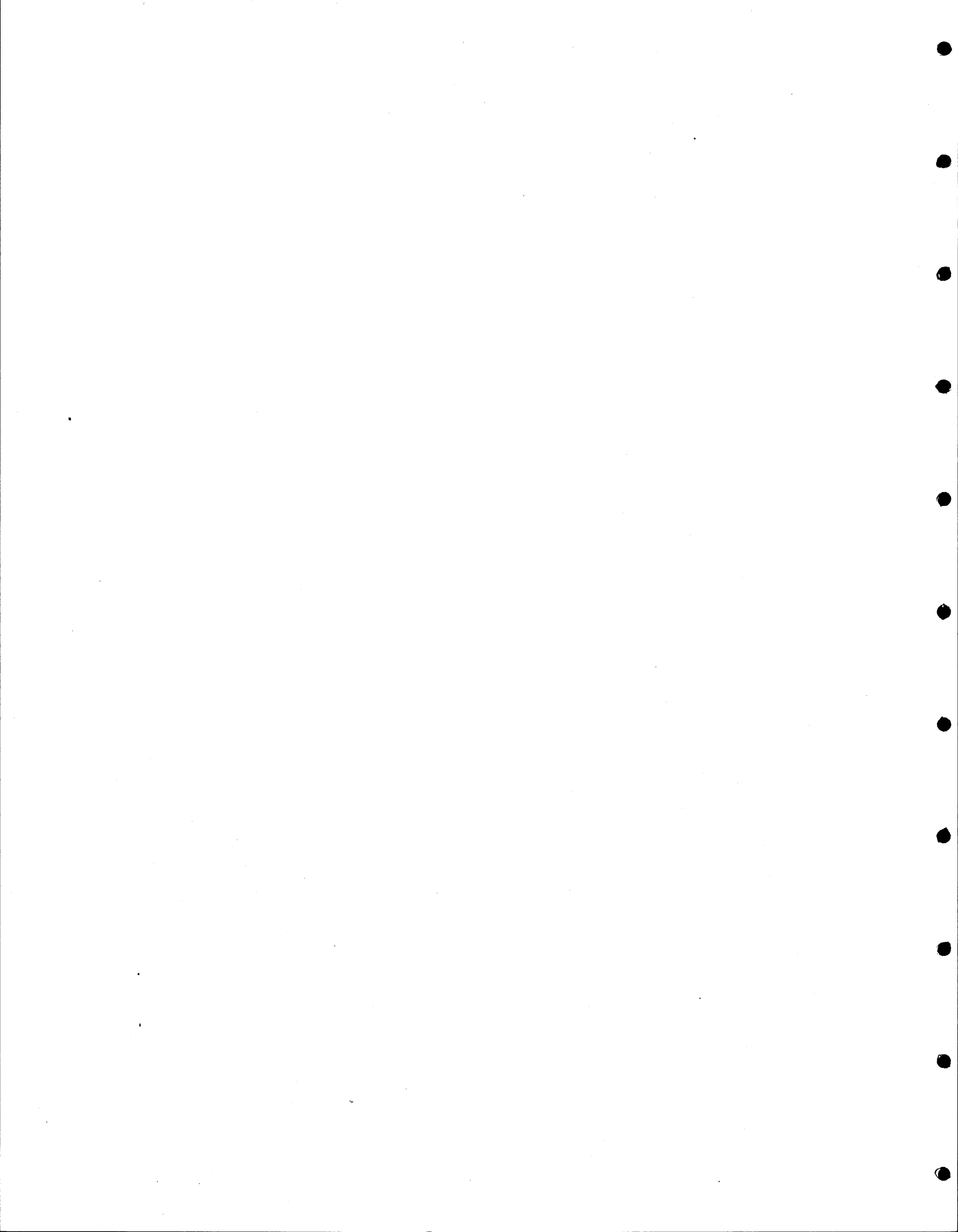
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## EXECUTIVE SUMMARY

The typical member of the group "Scientists and Engineers" (S/E)<sup>1</sup> in Sweden is a male, high school graduate in his early 40's, who works in manufacturing, or to a lesser extent, a service sector of the economy. There are exceptions to this characterization, since females, who comprise roughly one-sixth of scientists and engineers, are more likely to work in services than manufacturing, and are more likely to progress on to earn a bachelors degree. Female scientists and engineers also are slightly younger, more commonly in their late 30's. There is conflicting evidence regarding whether females are a significant, untapped source of new scientists and engineers. The comparatively minor difference in median ages suggests that females may not be entering the ranks of scientists and engineers in significantly larger numbers, but among the youngest S/E, females' account for a noticeably higher share of S/E.

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<sup>1</sup>

Data 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 Sweden for its assistance in providing data from the 1990 census, 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. The use of data not generated by the U.S. Bureau of the Census precludes performing the same statistical reviews the Bureau performs on its own data.

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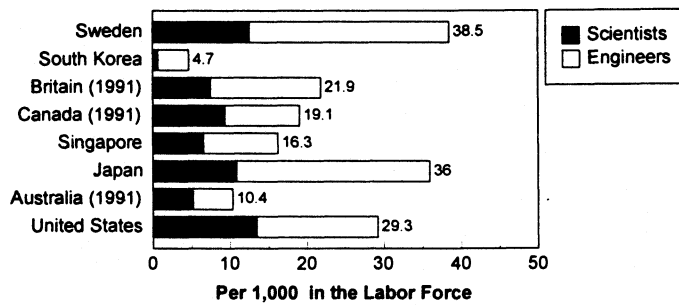
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## INTRODUCTION

This report presents statistics on scientists and engineers (S/E) in Sweden, based on the 1990 population census. It begins with a graphic comparison among countries, including the United States, and is followed by sections describing Sweden. Sweden has the highest number of scientists and engineers among countries in this series, relative to its economically active population. In 1990, Sweden had approximately 39 scientists and engineers per 1,000 members of its economically active population (Figure 1). This high proportion of S/E, coupled with the highest rate of research and development (R&D) in Europe, creates an environment that has contributed to the growth of several industries whose existence depends on access to the most advanced information and equipment. This favorable picture is offset, however, by the country's comparatively few scientists and engineers who have earned at least a bachelors degree (by comparison with most other countries studied in this series). Therefore, this shortcoming represents a potential hinderance to Sweden's technological development. Data tables provide detailed information upon which the graphic presentation is based. Users who wish to compare more closely data presented in this report with those of other countries should consult the list of IPC/CIR Staff Papers in the back of this report. The most recently published report of this series is "Scientists and Engineers in South Korea: 1990."



**Figure 1. Scientists and Engineers per 1,000 Members of the Economically Active Population: 1990**



Source: Table SW-1(90); Statistical Yearbook of Sweden: 1993, 1992, p. 174; Zaslav, 1997 (S. Korea), p. 2.

*The scientist and engineer occupations are largely populated by males.*

The vast majority of scientists and engineers (83 percent) are male (Table SW-1(90)). This contrasts sharply with the sex breakdown of the Swedish economically active population, of which males represent a narrow majority, 52 percent (U.S. Bureau of the Census, International Data Base 1997). In each of the countries that have been reviewed in recent reports of this series (Australia, Britain and Canada (1991), and South Korea, Japan and Singapore (1990)), males are far more heavily represented among scientists and engineers than the overall economically active population.

Females' share of scientist and engineer employment most likely would be even smaller than is implied by the employment breakdown by sex listed above if measured in full-time equivalencies. In the mid-1990s, just 60 percent of all females worked full-time (Umea University, 1997b, 1997, p. 1). Although no data are available on full- and part-time work in science and engineering, based on the national data it is likely that a higher share of females than males work part time.

Taking account of the sex composition of the overall economically active population and the scientist and engineer population, Sweden is roughly in the mid-range in terms of the preponderance of males (in numerical terms), compared to the other countries studied in this series. Sweden has the third highest (behind Japan and Britain) absolute deviation between the percentage of males among the economically active population and that of the scientist and engineer population.<sup>2</sup>

Although males presumably will continue to dominate science and engineering, data on new entrants to these fields suggest that the gap may diminish. More than one-quarter (28 percent) of scientists and engineers below age 25 are female (Table SW-1(90)). On the other hand, the minor difference between the median ages by sex (41 for males and 37 for females) suggests that women have been in the field for some time, and thus may not represent an untapped source of new S/E.

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<sup>2</sup> The absolute deviation for Sweden was 31 (since the percent of S/E who are male is 83 percent and the percent of males in the economically active population is 52 percent), compared to 44 for Japan and 32 for Britain.

*Scientists and engineers are dispersed widely among the employment categories.*

Within the employment category "scientists and engineers,"<sup>3</sup> those with specialization in mechanical engineering, electronic and related engineering, and social science are most numerous, accounting for 58 percent of all S/E. Males account for the vast majority of the 99,293 scientists and engineers in these fields, particularly among the engineering fields (Table SW-1(90)). The overall distribution of scientists and engineers is dispersed slightly more among males than females.<sup>4</sup> Among males, in addition to the three categories listed above, there are substantial numbers of computer scientists and electrical engineers (Figure 2). Among female S/E, the largest share are social scientists (43 percent). The percentage shares of the remaining occupation categories are much lower (Figure 3).

There appears to be a link between mechanical engineers and manufacturing's share of gross domestic output (GDP). A survey of 200 small to medium-sized Swedish manufacturing firms revealed that the most successful companies attributed their success to an active effort to integrate new technology into their manufacturing systems. These companies reportedly were the most adept in terms of cost reduction, decreased lead time, increased product quality and increased flexibility (Sandberg, 1992, p. 21). Much of the work associated with integrating new technology is performed by mechanical engineers. In 1993, mechanical engineers accounted for 27 percent of all S/E, while manufacturing generated 24.4 percent of GDP (Table SW-1(91) and "Fact Sheet," 1997, p. 4). This similarity may be due to a link between the functions of mechanical engineers and economic performance, or to chance. Further investigation could determine the reason for the similarity. Mechanical engineering also is a focus of Swedish R&D work. In 1989, R&D in the metal and mechanical engineering sectors represented the highest share of Swedish R&D. It also was the highest of 13 leading countries (including Sweden) in that area of economic activity.<sup>5</sup>

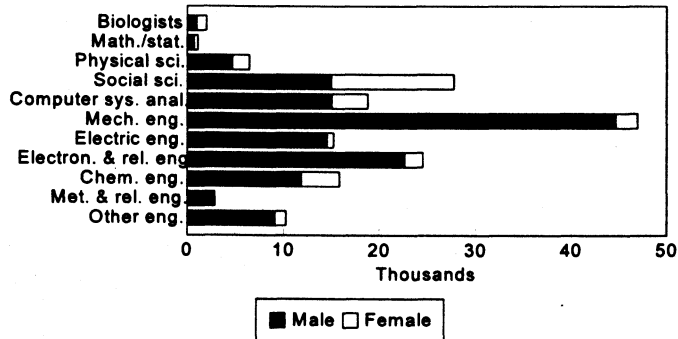
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<sup>3</sup> See Table SW-1(90) for a list of occupations that constitute the category, "scientists and engineers."

<sup>4</sup> The standard deviation among occupation categories for males is 8.47 percent, compared to 7.95 percent for females.

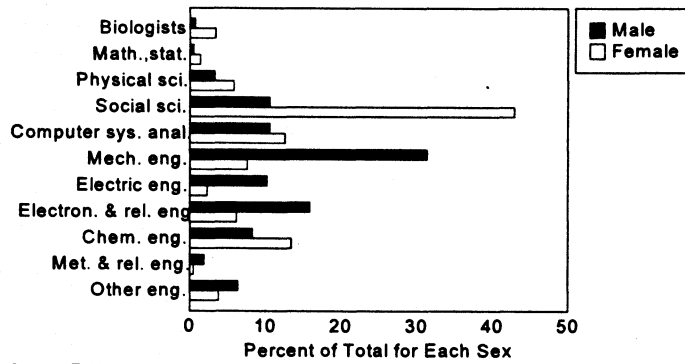
<sup>5</sup> The countries are Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Norway, Spain, Sweden, the United Kingdom, and the United States (Jacobsson and Philipson, 1996, p. 246). The share is referred to as the Revealed Technological Comparative Advantage (RTCA).

**Figure 2. Scientists and Engineers by Specialty and Sex, for Sweden: 1990**



Source:  
Table SW-1(90).

**Figure 3. Distribution of Scientists and Engineers by Specialty and Sex, for Sweden:1990**



Source: Table SW-1(90).

*The scientist and engineer population is generally older than in most other countries studied in this series.*

Due at least in part to the age structure of the country's labor force (see below), Sweden has the smallest share of its S/E population among the younger age groups of all the countries studied in this series.<sup>6</sup> Just one-third of scientists and engineers are below age 35, with a median age of 41 years (Table SW-1(90)). Of the younger S/E (below age 35), a small number are under age 25, followed sequentially by almost equal numbers of S/E in the 25-29 and 30-34 age cohorts. Considered by sex, a higher share of female S/E are among the younger age groups (up to age 34) than are males (44 percent, compared to 31 percent) (Table SW-1(90)). In terms of occupations, computer systems analysts have the highest share among the younger age groups (45 percent), followed by biologists (42 percent) (Table SW-1(90) and Figure 4).

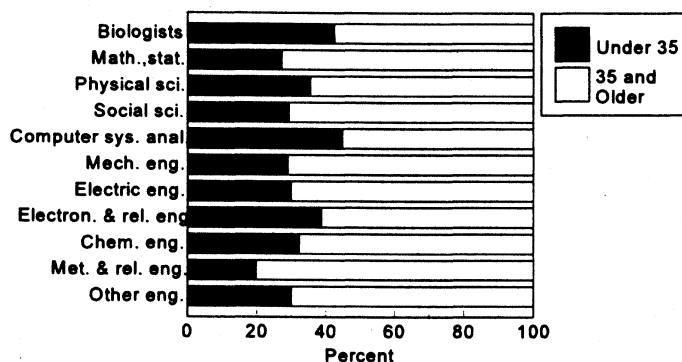
Sweden's overall labor force is distributed somewhat more evenly between younger and older ages than the scientist and engineer population (using age 35 as the decision criteria). In 1990, 39 percent of the country's labor force was below age 35. The sex breakdown of Sweden's labor force, in terms of distribution between younger and older ages is virtually identical (40 percent for males and 39 percent for females) (Statistics Sweden, 1992, p. 163). This may suggest that Sweden has a mature labor force, where females already are highly represented. In terms of scientists and engineers, females are concentrated among the younger age cohorts to a greater extent than are males (Figure 5).

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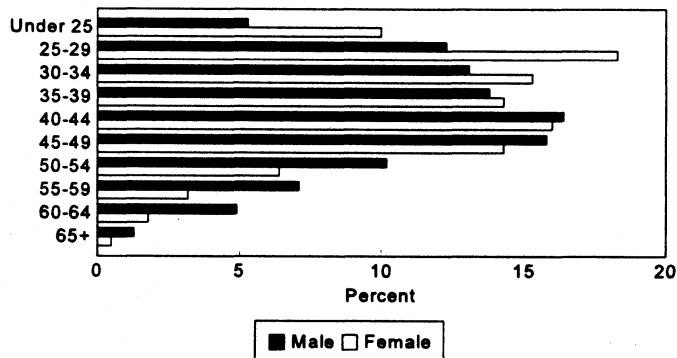
Britain has the next lowest share among the younger age groups, at 44 percent (Zaslow, 1997a, p. 10).

Figure 4. Scientists and Engineers by Age Group, for Sweden: 1990



Source: Table SW-1(90).

Figure 5. Distribution of Scientists and Engineers by Age and Sex, for Sweden: 1990

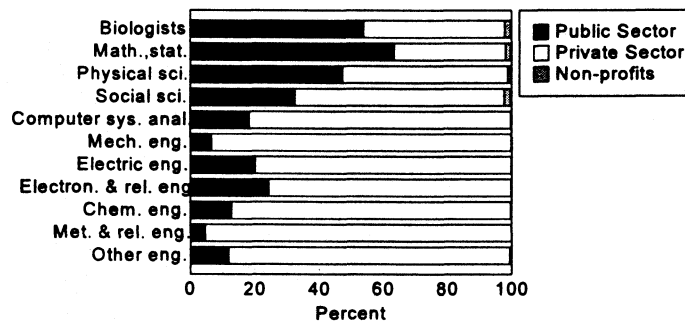


Source: Table SW-1(90).

*The vast majority of scientists and engineers work in the private sector.*

Eighty six percent of engineers and 68 percent of scientists work in the private sector, producing a combined total for the group of 80 percent (Table SW-2(90)). The share of males in the private sector is greater than that of females, 83 and 67 percent, respectively. Metallurgical, mining and petroleum engineers, and mechanical engineers have the two highest shares of S/E, at 95 and 93 percent, respectively. Alternatively, mathematicians and statisticians have the highest share of public sector workers, at 63 percent (Table SW-2(90) and Figure 6). The small share of S/E in the public sector also is in stark contrast with the employment distribution for the country as a whole, as one-third of the total labor force is employed by the public sector (Umea University, 1997b, pp. 4, 5).

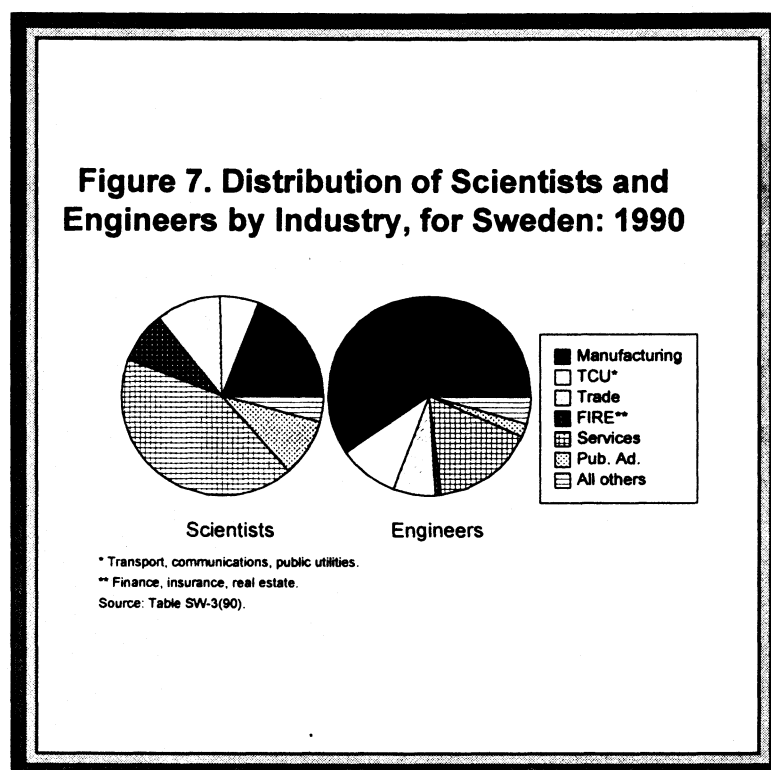
**Figure 6. Scientists and Engineers by Sector of Ownership, for Sweden: 1990\***



\* There are negligible numbers of S/E in the "Others" and "Unknown" sectors.  
Source: Table SW-2(90).

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

The manufacturing and services industries together employ 61 percent of scientists and 76 percent of engineers (Table SW-3(90) and Figure 7). Engineers comprise the vast majority of S/E in manufacturing, while scientists are a slight majority in services (Table SW-3(90)). Taking account of concentration among all economic sectors, engineers are concentrated in fewer sectors than are scientists.<sup>7</sup> At 71 percent, the share of Sweden's scientists and engineers working in manufacturing and services is virtually identical to that of South Korea, Great Britain and Singapore (at 72 percent) (Zaslow, 1997b, p. 11) and 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).



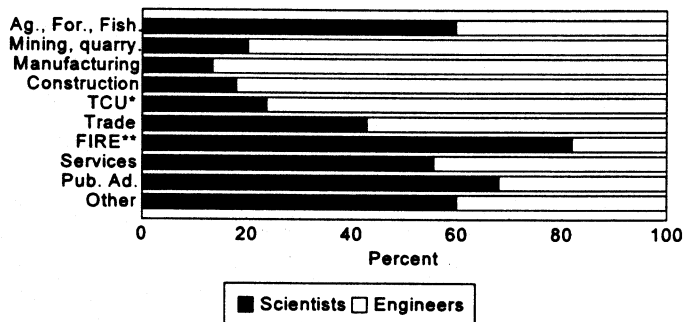
<sup>7</sup> Two measures which quantify concentration are the Herfindahl-Hirschman Index (H Index) (the concentration of market share held by particular suppliers) and the coefficient of variation (the standard deviation divided by the mean). The H Indexes for both scientists and engineers are rather low, at .25 and .40, respectively (there is no specific threshold to indicate significant concentration). Their coefficients of variation are 1.28 and 1.82.



*Most industries exhibit a marked preference for either scientists or engineers.*

Most industries exhibit preference for hiring either scientists or engineers (Figure 8). Since scientists and engineers study different disciplines and develop different skills, these hiring practices probably reflect a matching process based on technological considerations. The agriculture (and related industries), finance, insurance and real estate, services and public administration sectors, as well as those S/E in unspecified sectors, are skewed toward employment of scientists. The mining and quarrying, manufacturing, construction, transport, communications and public utilities, and trade sectors are skewed toward employment of engineers. The greatest differential exists in manufacturing, finance, insurance and real estate, construction, mining and quarrying, and transport, communications and public utilities (Table SW-3(90)). For the remaining industrial sectors, the split between scientists and engineers is balanced more evenly. In international perspective, Sweden's distribution of scientists and engineers within industries most resembles those of Britain and Canada, among countries in this series.

**Figure 8. Distribution of Scientists and Engineers Within Industry Groups, for Sweden: 1990**



\* Trans., Commun., Public Utilities.

\*\* Finance, Insurance, Real Estate.

Source: Table SW-3(90).

*The fabricated metals sector is the largest employer of S/E in manufacturing.*

Most scientists and engineers in manufacturing (68 percent) are engaged in work related to fabricated metals (Figure 9). It employs 48,108 engineers, but just 6,513 scientists (although that is a majority of manufacturing industry scientists) (Table SW-4(90)).

Employment of scientists and engineers is concentrated in Sweden's key, export-driven industries.<sup>8</sup> The fabricated metals sector is the primary employer of S/E in Sweden due to opportunities in the country's automotive<sup>9</sup>, aviation, and military-related industries. The chemicals and related products sector is the second largest employer of scientists and engineers in manufacturing. This likely can be attributed to Sweden's significant pharmaceutical industry (Umea University, 1997b, p. 1). In addition, within manufacturing, there is a close correlation between the distribution of S/E and value added.<sup>10</sup>

Sweden's manufacturing sector (and consequently employment opportunities for scientists and engineers) is bolstered by substantial levels of U.S. foreign direct investment (FDI), as well as high levels of R&D. Roughly half of U.S. FDI in manufacturing in Europe is invested in Sweden and Britain, with investment in Sweden exceeding that of Britain in 1995 (Moline, 1996, p. 30). Important industries that have a major foreign presence (including U.S. companies) and which employ S/E are concentrated in telecommunications and medical equipment manufacturing (Moline, 1996, p. 31). Another factor that has created opportunities for S/E is the country's substantial commitment to R&D. Sweden's R&D expenditures, relative to GDP, are the highest in Europe, at 3.3 percent (Figure 10), which helps bolster many key industries. For instance, Sweden's substantial automobile industry relies heavily upon R&D.

An important reason for Sweden's comparatively high reported R&D expenditures is that Swedish manufacturing is dominated by large firms (Umea University, 1997b, p. 2). Larger companies tend to spend more on R&D than smaller firms, since larger firms, due to their greater production and sales volume, have greater potential economic returns on R&D (Caulkin, 1991, p. 36). Sweden has an unusually high share of large, multi-national corporations (MNC's) relative to the country's size. In 1992, nearly eight percent of the world's MNC's had their headquarters in Sweden, a country which in 1990 accounted for less than 2 tenths of one percent of the world's population (Umea University, 1997b, p. 2; U.S. Bureau of the Census, 1996, pp. A-6, A-9).

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<sup>8</sup> The H Indexes for scientists and engineers are .41 and .50, respectively. The coefficients of variation are 1.75 and 2.0.

<sup>9</sup> Volvo and Saab are major Swedish automakers.

<sup>10</sup> There is a .96 correlation between the percentage shares of scientists and engineers and value added by manufacturing sector (Table SW-4(90) and Statistics Sweden, 1992, p. 94),

Figure 9. Distribution of Scientists and Engineers in Manufacturing, by Industry, for Sweden: 1990

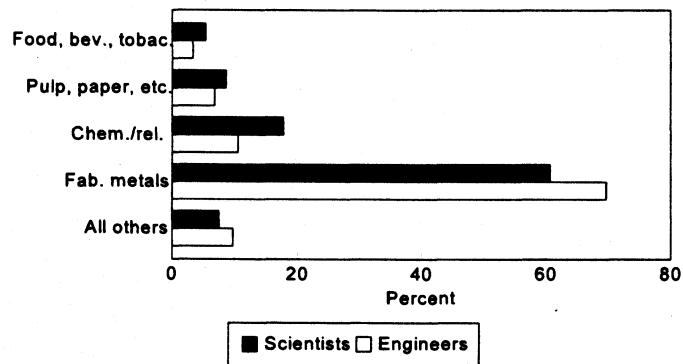
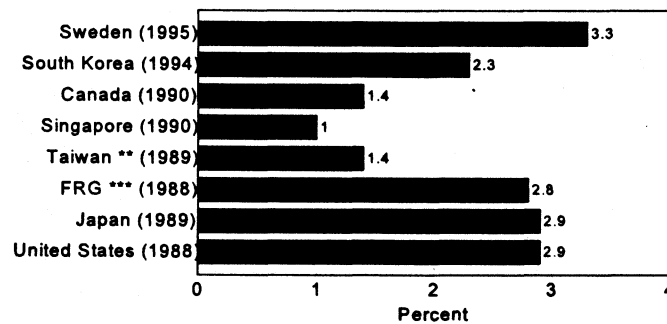


Figure 10. Share of Gross Domestic Product Used for R&D\*



\* Research and Development; \*\* GNP

\*\*\* Federal Republic of Germany

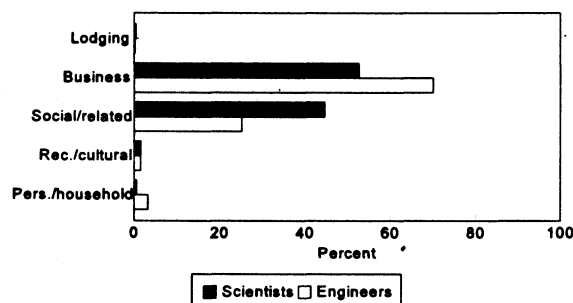
Source: Zaslow, 1997, p. 8, Moline, 1996, p. 31.

*The majority of scientists and engineers in the services sector work in business services.*

Most (60 percent) service sector scientists and engineers are employed in the provision of business services. The remaining S/E are engaged primarily in social and related community services (Table SW-5(90)). Considered individually, the distributions of both scientists and engineers are concentrated in business and social and related community services (Figure 11). The remaining three service sectors (lodging, recreation and cultural services, and personal and household services) employ minor shares of scientists and engineers. Sex selection/role modeling appears to affect the general service sector groups in which a scientist or engineer is likely to work. Although both sexes are concentrated in business services and social and related community services, males are far more likely to work in business services than are females. Among service sector scientists and engineers, 67 percent of males are in business services, compared to 40 percent of females (Table SW-5(90)).

In terms of degree of sectoral concentration, the pattern of employment among Swedish scientists in services, with an H index of .48 is similar to that found in Britain and Canada. For engineers, Sweden's H Index of .55 is the second lowest, after South Korea (Zaslow, 1997b, p. 28). Sweden's coefficient of variation, for scientists, at 1.32, is closest to that of Canada and for engineers, at 1.49, is closest to that of Britain (Zaslow, 1997a, p. 35; and Zaslow, 1996a, p. 33).

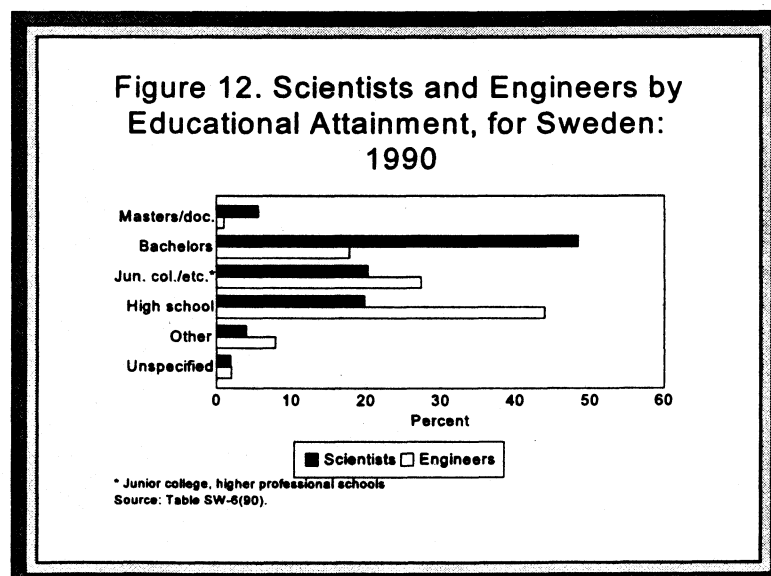
Figure 11. Scientists and Engineers in Services, by Industry, for Sweden: 1990



*Scientists and engineers are fairly evenly distributed by level of educational attainment, but the largest number report a high school degree to be their highest level of school.*

A high school degree is the most frequently reported level of educational attainment among scientists and engineers (36 percent of S/E) in Sweden. However, taken as a whole, a higher share (55 percent) of S/E have earned a college degree (or equivalent) (Table SW-6(90)). Of those with college degrees, half reported a bachelors degree as their highest level of educational attainment, while most of the remainder earned a junior college or higher professional degree. Few scientists and engineers (less than three percent) earned graduate degrees. Considering the roughly equal numbers of S/E who have earned a bachelors/junior college degree or a high school diploma, educational barriers of entry into the field appear to be fairly low. Nevertheless, scientists generally are more highly educated than engineers, as 74 percent of scientists and 46 percent of engineers have some form of college degree. Finally, the most commonly reported level of educational attainment for scientists is a bachelors degree, while for engineers it is a high school diploma (Figure 12).

Sweden ranks toward the low end of the scale in terms of scientists and engineers who have earned at least a four year degree, at 30 percent. Although South Korea has the lowest share of S/E with a four year degree (12 percent) (Zaslow, 1997b, p. 31), the other countries range from 48 percent for Japan to 68 percent for Singapore (Zaslow, 1995, p. 32; Zaslow, 1996c, p. 25). Though low by international standards, educational attainment among Swedish S/E appears to be higher than that of the country as a whole. The share of Swedish S/E with a college degree (including junior college and higher professional schools), at 55 percent, is considerably higher than the share of the Swedish populace that enters higher education within five years of high school graduation (approximately 30 percent) (Umea University, 1997a, p. 1).



### *Conclusions*

Sweden's concentration of scientists and engineers in its economically active population is the highest among the countries studied in recent reports of this series. This may be due, in part, because many S/E have only a high school degree. Sweden's scientist and engineer age structure is skewed somewhat more towards younger age groups than is the country's overall labor force. Males predominate among scientists and engineers, accounting for 83 percent of S/E. In this respect, Sweden's sex distribution most resembles that of Australia and Canada (where males account for 81 percent of all S/E). Sweden's scientist and engineer sex distribution contrasts sharply with that of its overall labor force. The latter split is 52-48, male to female. Female scientists and engineers are more concentrated in the youngest age groups than are males, and are far more heavily concentrated in the sciences.

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SW-1(90)

Table 1. Scientists and Engineers by Age and Sex, for Sweden: 1990

Both  
Sexes

Occupation	Total	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Median Age
TOTAL SCIENTISTS & ENGINEERS	171,994	10,437	22,905	23,158	23,866	28,055	26,728	16,375	11,061	7,451	1,958	41
SCIENTISTS	56,209	2,686	8,415	8,945	8,936	10,287	8,409	4,122	2,379	1,469	561	39
Biologists	2,008	65	344	444	397	306	234	116	73	23	6	37
Mathematicians & statisticians	1,138	43	158	109	104	220	239	120	69	55	21	43
Physical scientists	6,461	241	1,021	1,029	1,040	1,025	926	545	337	215	82	39
Chemists, physicists & astronomers	5,598	219	932	906	911	853	773	454	294	188	68	39
Geologists, geochemists, geophysicists, paleontologists	565	12	56	92	88	114	97	58	25	16	7	41
Meteorologists	275	10	27	27	35	56	53	33	18	10	6	43
Other professional occupations in physical science	23	0	6	4	6	2	3	0	0	1	1	37
Social scientists	27,773	1,153	3,182	3,794	4,261	5,384	4,698	2,414	1,461	999	427	41
Psychologists	5,731	8	119	438	1,007	1,503	1,556	650	246	133	71	44
Econ., econ. pol. researchers & anal.	22,042	1,145	3,063	3,356	3,254	3,881	3,142	1,764	1,215	866	356	40
Computer systems analysts	18,829	1,184	3,710	3,569	3,134	3,352	2,312	927	439	177	25	36
ENGINEERS	115,785	7,751	14,490	14,213	14,930	17,768	18,319	12,253	8,682	5,982	1,397	41
Mechanical engineers (incl. aero. eng.)	46,980	2,959	5,326	5,321	5,464	6,997	8,038	5,570	3,942	2,743	620	43
Electrical engineers	15,252	966	1,750	1,844	2,120	2,506	2,243	1,482	1,164	926	251	41
Electronics and teletechnical com. eng.	24,540	1,932	4,002	3,578	3,314	3,601	3,528	2,105	1,388	907	185	39
Chemical engineers	15,869	1,027	2,029	2,068	2,361	2,501	2,298	1,553	1,107	774	151	40
Metallurgical, mining and petrol. eng.	2,885	82	220	269	375	484	541	449	286	140	39	45
Other professional engineers n.e.c.	10,259	785	1,163	1,133	1,296	1,679	1,671	1,094	795	492	151	42



SW-1(90)

Table 1. Scientists and Engineers by Age and Sex, for Sweden: 1990--Continued

Male

Occupation	Total	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Median Age
TOTAL SCIENTISTS & ENGINEERS	142,318	7,474	17,467	18,610	19,629	23,319	22,483	14,488	10,114	6,928	1,806	41
SCIENTISTS	36,582	1,419	5,183	5,903	6,022	6,838	5,249	2,735	1,703	1,098	432	39
Biologists	994	19	146	191	213	170	120	62	47	20	6	38
Mathematicians & statisticians	728	26	100	80	61	129	147	83	46	41	15	43
Physical scientists	4,726	113	634	716	741	808	711	459	281	192	71	40
Chemists, physicists, astronomers	3,979	101	578	610	630	647	573	376	240	167	57	40
Geologists, geochemists, geophysicists, paleontologists	492	5	35	78	77	105	92	55	24	14	7	42
Meteorologists	234	7	15	24	30	54	43	28	17	10	6	43
Other professional occupations in physical science	21	0	6	4	4	2	3	0	0	1	1	36
Social scientists	15,043	421	1,569	2,052	2,454	2,972	2,316	1,316	935	691	317	41
Psychologists	1,790	3	30	132	392	539	420	166	56	31	21	43
Econ., econ. pol. researchers & anal.	13,253	418	1,539	1,920	2,062	2,433	1,896	1,150	879	660	296	41
Computer systems analysts	15,091	840	2,734	2,864	2,553	2,759	1,955	815	394	154	23	37
ENGINEERS	105,736	6,055	12,284	12,707	13,607	16,481	17,234	11,753	8,411	5,830	1,374	42
Mechanical engineers (incl. aero. eng.)	44,724	2,435	4,824	5,005	5,199	6,711	7,848	5,466	3,899	2,720	617	43
Electrical engineers	14,576	767	1,579	1,760	2,050	2,450	2,197	1,452	1,150	921	250	42
Electronics and teletechnical com. eng.	22,687	1,588	3,519	3,284	3,087	3,419	3,363	2,034	1,331	879	183	39
Chemical engineers	11,882	573	1,249	1,419	1,772	1,912	1,780	1,338	993	708	138	42
Metallurgical, mining and petrol. eng.	2,724	69	182	249	353	460	518	437	282	135	39	45
Other professional engineers n.e.c.	9,143	623	931	990	1,146	1,529	1,528	1,026	756	467	147	42

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Table I. Scientists and Engineers by Age and Sex, for Sweden: 1990--Continued

Occupation	Total	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Female	
												Median Age	Median Age
TOTAL SCIENTISTS & ENGINEERS	29,676	2,963	5,438	4,548	4,237	4,736	4,245	1,887	947	523	152	37	
SCIENTISTS	19,627	1,267	3,232	3,042	2,914	3,449	3,160	1,387	676	371	129	38	
Biologists	1,014	46	198	253	184	136	114	54	26	3	0	35	
Mathematicians, statisticians	410	17	58	29	43	91	92	37	23	14	6	43	
Physical scientists	1,735	128	387	313	299	217	215	86	56	23	11	35	
Chemists, physicists, astronomers	1,619	118	354	296	281	206	200	78	54	21	11	35	
Geologists, geochemists, geophysicists, paleontologists	73	7	21	14	11	9	5	3	1	2	0	32	
Meteorologists	41	3	12	3	5	2	10	5	1	0	0	37	
Other professional occupations in physical science	2	0	0	0	2	0	0	0	0	0	0	37	
Social scientists	12,730	732	1,613	1,742	1,807	2,412	2,382	1,098	526	308	110	41	
Psychologists	3,941	5	89	306	615	964	1,136	484	190	102	50	44	
Econ., econ. pol. researchers & anal.	8,789	727	1,524	1,436	1,192	1,448	1,246	614	336	206	60	37	
Computer systems analysts	3,738	344	976	705	581	593	357	112	45	23	2	33	
ENGINEERS	10,049	1,696	2,206	1,506	1,323	1,287	1,085	500	271	152	23	33	
Mechanical engineers (incl. aero. eng.)	2,256	524	502	316	265	286	190	104	43	23	3	31	
Electrical engineers	676	199	171	84	70	56	46	30	14	5	1	28	
Electronics and teletechnical com. eng.	1,853	344	483	294	227	182	165	71	57	28	2	31	
Chemical engineers	3,987	454	780	649	589	589	518	215	114	66	13	35	
Metallurgical, mining and petrol. eng.	161	13	38	20	22	24	23	12	4	5	0	37	
Other professional engineers n.e.c.	1,116	162	232	143	150	150	143	68	39	25	4	35	

Source:

Special Enumeration by Statistics Sweden, from the 1990 Census.

SW-2(90)

Table 2. Scientists and Engineers by Sector and Sex, for Sweden: 1990

Both  
Sexes

Occupations	Total	Total public sector	Gov't	Gov't owned comp.	Primary local auth.	County council	Other public sector	Private sector	Non-profit	Others	Unknown
TOTAL SCIENTISTS & ENGINEERS	171,994	32,928	12,328	10,139	5,345	4,606	510	138,061	978	4	23
SCIENTISTS	56,209	17,369	8,165	2,354	3,086	3,314	450	38,022	803	4	11
Biologists	2,008	1,083	731	12	138	183	19	883	42	0	0
Mathematicians, statisticians	1,138	722	587	45	38	34	18	395	21	0	0
Physical scientists	6,461	3,055	2,521	67	192	233	42	3,328	78	0	0
Chemists, physicists, astronomers	5,598	2,544	2,041	61	174	230	38	2,983	71	0	0
Geologists, geochemists, geophysicists, paleontologists	565	238	210	4	18	2	4	323	4	0	0
Meteorologists	275	257	254	2	0	1	0	17	1	0	0
Other professional occupations in physical science	23	16	16	0	0	0	0	5	2	0	0
Social scientists	27,773	9,048	2,915	959	2,310	2,523	341	18,094	618	4	9
Psychologists	5,731	4,194	759	5	1,253	2,127	50	1,303	234	0	0
Econ., econ. pol. researchers & anal.	22,042	4,854	2,156	954	1,057	396	291	16,791	384	4	9
Computer systems analysts	18,829	3,461	1,411	1,271	408	341	30	15,322	44	0	2
ENGINEERS	115,785	15,559	4,163	7,785	2,259	1,292	60	100,039	175	0	12
Mechanical engineers (incl. aero. eng.)	46,980	3,081	886	1,185	847	145	18	43,836	56	0	7
Electrical engineers	15,252	3,082	548	1,607	822	101	4	12,156	13	0	1
Electronics and teletechnical com. eng.	24,540	5,992	1,072	4,690	155	72	3	18,519	28	0	1
Chemical engineers	15,869	2,044	1,297	261	222	250	14	13,788	37	0	0
Metallurgical, mining and petrol. eng.	2,885	136	108	4	23	1	0	2,748	1	0	0
Other professional engineers n.e.c.	10,259	1,224	252	38	190	723	21	8,992	40	0	3

SW-2(90)

Table 2. Scientists and Engineers by Sector and Sex: 1990--Continued

Occupations	Total	Total public sector	Gov't	Gov't owned comps.	Primary local auth.	County council	Other public sector	Private sector	Non-profit	Others	Male	
											Unknown	Unknown
TOTAL SCIENTISTS & ENGINEERS	142,318	23,494	8,834	8,579	3,429	2,303	349	118,207	596	2	19	19
SCIENTISTS	36,582	9,897	5,304	1,608	1,420	1,263	302	26,228	448	2	7	7
Biologists	994	584	457	11	64	37	15	379	31	0	0	0
Mathematicians, statisticians	728	445	363	26	27	18	11	271	12	0	0	0
Physical scientists	4,726	2,263	1,901	55	119	157	31	2,408	55	0	0	0
Chemists, physicists, astronomers	3,979	1,835	1,491	49	110	157	28	2,095	49	0	0	0
Geologists, geochemists, geophysicists, paleontologists	492	195	179	4	9	0	3	294	3	0	0	0
Meteorologists	234	219	217	2	0	0	0	14	1	0	0	0
Other professional occupations in physical science	21	14	14	0	0	0	0	5	2	0	0	0
Social scientists	15,043	4,054	1,546	527	933	822	226	10,670	312	2	5	5
Psychologists	1,790	1,223	255	4	344	604	16	481	86	0	0	0
Econ., econ. pol. researchers & anal.	13,253	2,831	1,291	523	589	218	210	10,189	226	2	5	5
Computer systems analysts	15,091	2,551	1,037	989	277	229	19	12,500	38	0	2	2
ENGINEERS	105,736	13,597	3,530	6,971	2,009	1,040	47	91,979	148	0	12	12
Mechanical engineers (incl. aero. eng.)	44,724	2,930	842	1,132	798	140	18	41,735	52	0	7	7
Electrical engineers	14,576	2,932	529	1,514	788	98	3	11,633	10	0	1	1
Electronics and teletechnical com. eng.	22,687	5,324	1,046	4,080	134	62	2	17,335	27	0	1	1
Chemical engineers	11,882	1,295	835	211	119	119	11	10,555	32	0	0	0
Metallurgical, mining and petrol. eng.	2,724	119	93	4	21	1	0	2,604	1	0	0	0
Other professional engineers n.e.c.	9,143	997	185	30	149	620	13	8,117	26	0	3	3

SW-2(90)

Table 2. Scientists and Engineers by Sector and Sex: 1990--Continued

Occupations	Total	Total public sector	Gov't	Gov't owned comp.	Primary local auth.	County council	Other public sector	Private sector	Non-profit	Others	Female	
											Unknown	Female
TOTAL SCIENTISTS & ENGINEERS	29,676	9,434	3,494	1,560	1,916	2,303	161	19,854	382	2	4	4
SCIENTISTS	19,627	7,472	2,861	746	1,666	2,051	148	11,794	355	2	4	4
Biologists	1,014	499	274	1	74	146	4	504	11	0	0	0
Mathematicians, statisticians	410	277	224	19	11	16	7	124	9	0	0	0
Physical scientists	1,735	792	620	12	73	76	11	920	23	0	0	0
Chemists, physicists, astronomers	1,619	709	550	12	64	73	10	888	22	0	0	0
Geologists, geochemists, geophysicists, paleontologists	73	43	31	0	9	2	1	29	1	0	0	0
Meteorologists	41	38	37	0	0	1	0	3	0	0	0	0
Other professional occupations in physical science	2	2	2	0	0	0	0	0	0	0	0	0
Social scientists	12,730	4,994	1,369	432	1,377	1,701	115	7,424	306	2	4	4
Psychologists	3,941	2,971	504	1	909	1,523	34	822	148	0	0	0
Econ., econ. pol. researchers & anal.	8,789	2,023	865	431	468	178	81	6,602	158	2	4	4
Computer systems analysts	3,738	910	374	282	131	112	11	2,822	6	0	0	0
ENGINEERS	10,049	1,962	633	814	250	252	13	8,060	27	0	0	0
Mechanical engineers (incl. aero. eng.)	2,256	151	44	53	49	5	0	2,101	4	0	0	0
Electrical engineers	676	150	19	93	34	3	1	523	3	0	0	0
Electronics and teletechnical com. eng.	1,853	668	26	610	21	10	1	1,184	1	0	0	0
Chemical engineers	3,987	749	462	50	103	131	3	3,233	5	0	0	0
Metallurgical, mining and petrol. eng.	161	17	15	0	2	0	0	144	0	0	0	0
Other professional engineers n.e.c.	1,116	227	67	8	41	103	8	875	14	0	0	0

Source:

Special Enumeration by Statistics Sweden, from the 1990 Census.

SW-3(90)

Table 3. Scientists and Engineers by Industry and Sex, for Sweden: 1990

Both  
Sexes

Occupations	Total	Agri., hunt., for., & fishing	Mining & quarry.	Manufac- turing	Const.	Trans, com., & public util.	Trade	Finance, insur. & real est.	Services	Public admin.	Other
TOTAL SCIENTISTS & ENGINEERS	171,994	492	618	79,780	4,638	14,572	13,770	5,660	42,841	7,798	1,825
SCIENTISTS	56,209	294	125	10,734	835	3,466	5,903	4,641	23,814	5,302	1,095
Biologists	2,008	47	0	462	5	21	113	32	987	316	25
Mathematicians, statisticians	1,138	1	1	82	4	49	26	161	266	539	9
Physical scientists	6,461	49	66	1,629	34	154	157	126	3,637	534	75
Chemists, physicists, astronomers	5,598	46	13	1,612	17	141	150	122	3,143	284	70
Geologists, geochemists, geophysicists, paleontologists	565	3	53	9	17	11	7	3	425	32	5
Meteorologists	275	0	0	6	0	2	0	1	49	217	0
Other professional occupations in physical science	23	0	0	2	0	0	0	0	20	1	0
Social scientists	27,773	167	37	4,096	701	1,928	3,055	2,992	11,296	2,587	914
Psychologists	5,731	17	0	27	7	26	26	44	4,668	401	515
Econ., econ. pol. researchers & anal.	22,042	150	37	4,069	694	1,902	3,029	2,948	6,628	2,186	399
Computer systems analysts	18,829	30	21	4,465	91	1,314	2,552	1,330	7,628	1,326	72
ENGINEERS	115,785	198	493	69,046	3,803	11,106	7,867	1,019	19,027	2,496	730
Mechanical engineers (incl. aero. eng.)	46,980	64	86	30,843	2,068	1,810	2,737	455	7,740	822	355
Electrical engineers	15,252	18	42	4,530	1,416	4,093	689	154	3,768	460	82
Electronics and teletechnical com. eng.	24,540	18	8	13,879	142	4,763	2,204	64	2,624	739	99
Chemical engineers	15,869	79	43	11,216	51	348	546	192	3,027	263	104
Metallurgical, mining and petrol. eng.	2,885	4	311	2,089	37	29	24	13	336	32	10
Other professional engineers n.e.c.	10,259	15	3	6,489	89	63	1,667	141	1,532	180	80

SW-3(90)

Table 3. Scientists and Engineers by Industry and Sex, for Sweden: 1990--Continued

Occupations											Male	
	Total	Agri., hunt, for., & fishing	Mining & quarry.	Manufac- turing	Const.	Trans., com. & public util.	Trade	Finance, insur. & real est.	Services	Public admin.	Other	
TOTAL SCIENTISTS & ENGINEERS	142,318	375	584	70,866	4,214	12,359	11,528	3,808	31,735	5,581	1,268	
SCIENTISTS	36,582	218	108	7,707	504	2,299	4,061	2,928	14,852	3,321	584	
Biologists	994	38	0	164	4	15	50	9	500	202	12	
Mathematicians, statisticians	728	1	1	62	3	31	17	97	182	325	9	
Physical scientists	4,726	36	59	1,144	28	120	93	88	2,695	410	53	
Chemists, physicists, astronomers	3,979	33	11	1,128	13	108	86	84	2,278	190	48	
Geologists, geochemists, geophysicists, paleontologists	492	3	48	8	15	10	7	3	365	28	5	
Meteorologists	234	0	0	6	0	2	0	1	34	191	0	
Other professional occupations in physical science	21	0	0	2	0	0	0	0	18	1	0	
Social scientists	15,043	119	28	2,625	395	1,097	1,731	1,820	5,323	1,456	449	
Psychologists	1,790	6	0	13	2	12	13	19	1,431	124	170	
Econ., econ. pol. researchers & anal.	13,253	113	28	2,612	393	1,085	1,718	1,801	3,892	1,332	279	
Computer systems analysts	15,091	24	20	3,712	74	1,036	2,170	914	6,152	928	61	
ENGINEERS	105,736	157	476	63,159	3,710	10,060	7,467	880	16,883	2,260	684	
Mechanical engineers (incl. aero. eng.)	44,724	64	85	29,349	2,023	1,683	2,669	447	7,282	779	343	
Electrical engineers	14,576	16	40	4,304	1,385	3,902	672	151	3,586	439	81	
Electronics and teletechnical com. eng.	22,687	17	8	12,887	136	4,146	2,138	56	2,482	721	96	
Chemical engineers	11,882	41	36	8,809	41	245	411	96	1,950	167	86	
Metallurgical, mining and petrol. eng.	2,724	4	304	1,971	37	29	24	12	304	29	10	
Other professional engineers n.e.c.	9,143	15	3	5,839	88	55	1,553	118	1,279	125	68	

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Table 3. Scientists and Engineers by Industry and Sex, for Sweden: 1990--Continued

Occupations	Total	Agri., hunt., for., & fishing	Mining & quarry.	Manufacturing	Const.	Trans., com., & public. & util.	Trade	Finance, insur. & real est.	Services	Public admin.	Female
											Other
TOTAL SCIENTISTS & ENGINEERS	29,676	117	34	8,914	424	2,213	2,242	1,852	11,106	2,217	557
SCIENTISTS	19,627	76	17	3,027	331	1,167	1,842	1,713	8,962	1,981	511
Biologists	1,014	9	0	298	1	6	63	23	487	114	13
Mathematicians, statisticians	410	0	0	20	1	18	9	64	84	214	0
Physical scientists	1,735	13	7	485	6	34	64	38	942	124	22
Chemists, physicists, astronomers	1,619	13	2	484	4	33	64	38	865	94	22
Geologists, geochemists, geophysicists, paleontologists	73	0	5	1	2	1	0	0	60	4	0
Meteorologists	41	0	0	0	0	0	0	0	15	26	0
Other professional occupations in physical science	2	0	0	0	0	0	0	0	2	0	0
Social scientists	12,730	48	9	1,471	306	831	1,324	1,172	5,973	1,131	465
Psychologists	3,941	11	0	14	5	14	13	25	3,237	277	345
Econ., econ. pol. researchers & anal.	8,789	37	9	1,457	301	817	1,311	1,147	2,736	854	120
Computer systems analysts	3,738	6	1	753	17	278	382	416	1,476	398	11
ENGINEERS	10,049	41	17	5,887	93	1,046	400	139	2,144	236	46
Mechanical engineers (incl. aero. eng.)	2,256	0	1	1,494	45	127	68	8	458	43	12
Electrical engineers	676	2	2	226	31	191	17	3	182	21	1
Electronics and teletechnical com. eng.	1,853	1	0	992	6	617	66	8	142	18	3
Chemical engineers	3,987	38	7	2,407	10	103	135	96	1,077	96	18
Metallurgical, mining and petrol. eng.	161	0	7	118	0	0	0	1	32	3	0
Other professional engineers n.e.c.	1,116	0	0	650	1	8	114	23	253	55	12

Source:

Special Enumeration by Statistics Sweden, from the 1990 Census.



SW-4(90)

Table 4. Scientists and Engineers by Manufacturing Industry and Sex, for Sweden: 1990

Both  
Sexes

Occupations	Total	Food, bev., tobacco	Text., app., leather	Wood & wood prods.	Pulp, paper, print. & publ.	Chems. & rel. prods.	Non-met. mins. (ex. fuels)	Basic metals	Fabri- cated metals	Other mfg.
TOTAL SCIENTISTS & ENGINEERS	79,780	2,843	838	1,963	5,642	9,199	1,245	3,231	54,621	198
SCIENTISTS	10,734	584	93	189	925	1,915	144	340	6,513	31
Biologists	462	15	3	0	13	420	0	0	11	0
Mathematicians, statisticians	82	4	0	0	13	32	0	5	28	0
Physical scientists	1,629	151	9	8	97	828	38	68	428	2
Chemists, physicists, astronomers	1,612	150	9	5	96	826	38	68	418	2
Geologists, geochemists, geophysicists, paleontologists	9	1	0	1	0	1	0	0	6	0
Meteorologists	6	0	0	0	1	1	0	0	4	0
Other professional occupations in physical science	2	0	0	2	0	0	0	0	0	0
Social scientists	4,096	284	66	148	532	448	79	171	2,347	21
Psychologists	27	1	0	1	10	3	0	0	12	0
Econ., econ. pol. researchers & anal.	4,069	283	66	147	522	445	79	171	2,335	21
Computer systems analysts	4,465	130	15	33	270	187	27	96	3,699	8
ENGINEERS	69,046	2,259	745	1,774	4,717	7,284	1,101	2,891	48,108	167
Mechanical engineers (incl. aero. eng.)	30,843	168	56	114	587	561	138	424	28,757	38
Electrical engineers	4,530	46	18	43	227	126	34	144	3,891	1
Electronics and teletechnical com. eng.	13,879	27	5	11	145	129	19	64	13,474	5
Chemical engineers	11,216	1,998	46	22	1,995	5,313	357	294	1,187	4
Metallurgical, mining and petrol. eng.	2,089	1	0	1	3	6	15	1,945	118	0
Other professional engineers n.e.c.	6,489	19	620	1,583	1,760	1,149	538	20	681	119

SW-4(90)

Table 4. Scientists and Engineers by Manufacturing Industry and Sex, for Sweden: 1990--Continued

Male

Occupations	Total	Food, bev., tobacco	Text., app., leather	Wood & wood prods.	Pulp, paper, print. & publ.	Chems. & rel. prods.	Non-met. mins. (excl. fuels)	Basic metals	Fabri- cated metals	Other mfg.
TOTAL SCIENTISTS & ENGINEERS	70,866	2,162	641	1,820	4,804	6,945	1,125	2,978	50,217	174
SCIENTISTS	7,707	372	57	138	620	1,155	108	272	4,967	18
Biologists	164	6	1	0	6	145	0	0	6	0
Mathematicians, statisticians	62	3	0	0	10	23	0	4	22	0
Physical scientists	1,144	76	3	7	64	552	35	58	348	1
Chemists, physicists, astronomers	1,128	75	3	4	63	550	35	58	339	1
Geologists, geochemists, geophysicists, paleontologists	8	1	0	1	0	1	0	0	5	0
Meteorologists	6	0	0	0	1	1	0	0	4	0
Other professional occupations in physical science	2	0	0	2	0	0	0	0	0	0
Social scientists	2,625	184	42	102	313	289	50	123	1,512	10
Psychologists	13	0	0	0	6	2	0	0	5	0
Econ., econ. pol. researchers & anal.	2,612	184	42	102	307	287	50	123	1,507	10
Computer systems analysts	3,712	103	11	29	227	146	23	87	3,079	7
ENGINEERS	63,159	1,790	584	1,682	4,184	5,790	1,017	2,706	45,250	156
Mechanical engineers (incl. aero. eng.)	29,349	164	53	109	567	545	133	407	27,334	37
Electrical engineers	4,304	45	18	42	219	123	31	141	3,684	1
Electronics and teletechnical com. eng.	12,887	26	4	11	141	121	19	61	12,499	5
Chemical engineers	8,809	1,537	24	20	1,749	3,930	319	246	982	2
Metallurgical, mining and petrol. eng.	1,971	1	0	1	2	6	15	1,833	113	0
Other professional engineers n.e.c.	5,839	17	485	1,499	1,506	1,065	500	18	638	111

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Table 4. Scientists and Engineers by Manufacturing Industry and Sex, for Sweden: 1990--Continued Female

Occupations	Total	Food, bev., tobacco	Text., app., leather	Wood & wood prods.	Pulp, paper, print. & publ.	Chems. & rel. prods.	Non-met. mins. (excl. fuels)	Basic metals	Fabri-cated metals	Other mfg.
<b>TOTAL SCIENTISTS &amp; ENGINEERS</b>	8,914	681	197	143	838	2,254	120	253	4,044	24
<b>SCIENTISTS</b>	3,027	212	36	51	305	760	36	68	1,546	13
Biologists	298	9	2	0	7	275	0	0	5	0
Mathematicians, statisticians	20	1	0	0	3	9	0	1	6	0
Physical scientists	485	75	6	1	33	276	3	10	80	1
Chemists, physicists, astronomers	484	75	6	1	33	276	3	10	79	1
Geologists, geochemists, geophysicists, paleontologists	1	0	0	0	0	0	0	0	1	0
Meteorologists	0	0	0	0	0	0	0	0	0	0
Other professional occupations in physical science	0	0	0	0	0	0	0	0	0	0
<b>Social scientists</b>	1,471	100	24	46	219	159	29	48	835	11
Psychologists	14	1	0	1	4	1	0	0	7	0
Economists, econ. pol. researchers and analysts	1,457	99	24	45	215	158	29	48	828	11
Computer systems analysts	753	27	4	4	43	41	4	9	620	1
<b>ENGINEERS</b>	5,887	469	161	92	533	1,494	84	185	2,858	11
Mechanical engineers (incl. aeronautical eng.)	1,494	4	3	5	20	16	5	17	1,423	1
Electrical engineers	226	1	0	1	8	3	3	3	207	0
Electronics and teletechnical communications engineers	992	1	1	0	4	8	0	3	975	0
Chemical engineers	2,407	461	22	2	246	1,383	38	48	205	2
Metallurgical, mining and petroleum engineers	118	0	0	0	1	0	0	112	5	0
Other professional engineers n.e.c.	650	2	135	84	254	84	38	2	43	8

Source: Special Enumeration by Statistics Sweden, from 1990 Census.

SW-5(90)

Table 5. Scientists and Engineers by Service Industry and Sex, for Sweden: 1990

Both  
Sexes

Occupations	Total	Lodging services	Business services	Social & related commun. services	Recreation & cultural services	Personal & household services
TOTAL SCIENTISTS & ENGINEERS	42,841	133	25,864	15,450	652	742
SCIENTISTS	23,814	104	12,547	10,655	373	135
Biologists	987	1	69	894	20	3
Mathematicians, statisticians	266	1	87	170	7	1
Physical scientists	3,637	4	694	2,895	32	12
Chemists, physicists, astronomers	3,143	4	315	2,783	29	12
Geologists, geochemists, geophysicists, paleontologists	425	0	346	78	1	0
Meteorologists	49	0	32	15	2	0
Other professional occupations in physical science	20	0	1	19	0	0
Social scientists	11,296	95	5,021	5,820	267	93
Psychologists	4,668	3	410	4,235	17	3
Econ., econ. pol. researchers & anal.	6,628	92	4,611	1,585	250	90
Computer systems analysts	7,628	3	6,676	876	47	26
ENGINEERS	19,027	29	13,317	4,795	279	607
Mechanical engineers (incl. aero. eng.)	7,740	11	6,734	591	46	358
Electrical engineers	3,768	4	3,335	295	23	111
Electronics and teletechnical com. eng.	2,624	7	1,658	680	171	108
Chemical engineers	3,027	4	796	2,201	14	12
Metallurgical, mining and petrol. eng.	336	0	311	24	0	1
Other professional engineers n.e.c.	1,532	3	483	1,004	25	17

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Table 5. Scientists and Engineers by Service Industry and Sex, for Sweden:  
1990--Continued

Male

Occupations	Total	Lodging services	Business services	Social & related commun. services	Recreation & cultural services	Personal & household services
TOTAL SCIENTISTS & ENGINEERS	31,735	77	21,418	9,104	464	672
SCIENTISTS	14,852	54	9,029	5,481	205	83
Biologists	500	1	35	447	15	2
Mathematicians, statisticians	182	0	65	113	3	1
Physical scientists	2,695	4	569	2,095	19	8
Chemists, physicists, astronomers	2,278	4	243	2,006	17	8
Geologists, geochemists, geophysicists, paleontologists	365	0	304	60	1	0
Meteorologists	34	0	21	12	1	0
Other professional occupations in physical science	18	0	1	17	0	0
Social scientists	5,323	47	2,972	2,124	132	48
Psychologists	1,431	1	158	1,263	8	1
Econ., econ. pol. researchers & anal.	3,892	46	2,814	861	124	47
Computer systems analysts	6,152	2	5,388	702	36	24
ENGINEERS	16,883	23	12,389	3,623	259	589
Mechanical engineers (incl. aero. eng.)	7,282	10	6,319	555	44	354
Electrical engineers	3,586	4	3,173	278	23	108
Electronics and teletechnical com. eng.	2,482	5	1,580	630	162	105
Chemical engineers	1,950	2	623	1,306	11	8
Metallurgical, mining and petrol. eng.	304	0	285	18	0	1
Other professional engineers n.e.c.	1,279	2	409	836	19	13

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

1990--Continued

Occupations	Female					
	Total	Lodging services	Business services	Social & related commun. services	Recreation & cultural services	Personal & household services
TOTAL SCIENTISTS & ENGINEERS	11,106	56	4,446	6,346	188	70
SCIENTISTS	8,962	50	3,518	5,174	168	52
Biologists	487	0	34	447	5	1
Mathematicians, statisticians	84	1	22	57	4	0
Physical scientists	942	0	125	800	13	4
Chemists, physicists, astronomers	865	0	72	777	12	4
Geologists, geochemists, geophysicists, paleontologists	60	0	42	18	0	0
Meteorologists	15	0	11	3	1	0
Other professional occupations in physical science	2	0	0	2	0	0
Social scientists	5,973	48	2,049	3,696	135	45
Psychologists	3,237	2	252	2,972	9	2
Econ., econ. pol. researchers & anal.	2,736	46	1,797	724	126	43
Computer systems analysts	1,476	1	1,288	174	11	2
ENGINEERS	2,144	6	928	1,172	20	18
Mechanical engineers (incl. aero. eng.)	458	1	415	36	2	4
Electrical engineers	182	0	162	17	0	3
Electronics and teletechnical com. eng.	142	2	78	50	9	3
Chemical engineers	1,077	2	173	895	3	4
Metallurgical, mining and petrol. eng.	32	0	26	6	0	0
Other professional engineers n.e.c.	253	1	74	168	6	4

Source:  
Special Enumeration by Statistics Sweden, from the 1990 Census.

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Table 6. Scientists and Engineers by Educational Attainment and Sex, for Sweden: 1990

Both  
Sexes

Occupations	Total	Masters or doctorate	Bachelors	Junior college, higher prof. schools	High school	Other	Unspecified
TOTAL SCIENTISTS & ENGINEERS	171,994	4,313	47,852	43,124	61,998	11,370	3,337
SCIENTISTS	56,209	3,123	27,191	11,434	11,146	2,265	1,050
Biologists	2,008	440	1,062	381	71	37	17
Mathematicians, statisticians	1,138	109	714	106	125	50	34
Physical scientists	6,461	1,909	3,242	520	527	141	122
Chemists, physicists, astronomers	5,598	1,735	2,663	485	488	124	103
Geologists, geochemists, geophysicists, paleontologists	565	145	343	24	29	13	11
Meteorologists	275	20	228	9	8	3	7
Other professional occupations in physical science	23	9	8	2	2	1	1
Social scientists	27,773	516	14,965	4,110	6,206	1,279	697
Psychologists	5,731	337	5,045	75	122	48	104
Econ., econ. pol. researchers & anal.	22,042	179	9,920	4,035	6,084	1,231	593
Computer systems analysts	18,829	149	7,208	6,317	4,217	758	180
ENGINEERS	115,785	1,190	20,661	31,690	50,852	9,105	2,287
Mechanical engineers (incl. aero. eng.)	46,980	229	7,017	12,722	22,050	4,000	962
Electrical engineers	15,252	106	2,087	4,715	7,345	633	366
Electronics and teletechnical com. eng.	24,540	193	5,421	7,436	10,009	1,087	394
Chemical engineers	15,869	539	4,085	3,944	5,705	1,356	240
Metallurgical, mining and petrol. eng.	2,885	44	596	385	1,406	386	68
Other professional engineers n.e.c.	10,259	79	1,455	2,488	4,337	1,643	257

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Table 6. Scientists and Engineers by Educational Attainment and Sex, for Sweden: 1990--Continued

Occupations	Total	Masters or doctorate	Bachelors	Junior college, higher prof. schools	High school	Other	Male
							Unspecified
TOTAL SCIENTISTS & ENGINEERS	142,318	3,523	34,926	36,145	55,128	9,681	2,915
SCIENTISTS	36,582	2,455	17,068	7,941	7,007	1,376	735
Biologists	994	319	527	62	43	31	12
Mathematicians, statisticians	728	97	468	55	65	21	22
Physical scientists	4,726	1,603	2,200	320	392	108	103
Chemists, physicists, astronomers	3,979	1,437	1,716	292	358	91	85
Geologists, geochemists, geophysicists, paleontologists	492	138	287	17	26	13	11
Meteorologists	234	20	190	9	6	3	6
Other professional occupations in physical science	21	8	7	2	2	1	1
Social scientists	15,043	299	8,262	2,500	2,944	582	456
Psychologists	1,790	144	1,511	25	55	23	32
Econ., econ. pol. researchers & anal.	13,253	155	6,751	2,475	2,889	559	424
Computer systems analysts	15,091	137	5,611	5,004	3,563	634	142
ENGINEERS	105,736	1,068	17,858	28,204	48,121	8,305	2,180
Mechanical engineers (incl. aero. eng.)	44,724	224	6,526	11,867	21,407	3,762	938
Electrical engineers	14,576	101	1,951	4,391	7,171	600	362
Electronics and teletechnical com. eng.	22,687	185	4,947	6,824	9,473	886	372
Chemical engineers	11,882	446	2,719	2,576	4,741	1,199	201
Metallurgical, mining and petrol. eng.	2,724	42	537	370	1,347	362	66
Other professional engineers n.e.c.	9,143	70	1,178	2,176	3,982	1,496	241



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Table 6. Scientists and Engineers by Educational Attainment and Sex, for Sweden: 1990--Continued

Occupations	Total	Masters or doctorate	Bachelors	Junior college higher prof. schools	High school	Other	Female	
							Unspecified	
TOTAL SCIENTISTS & ENGINEERS	29,676	790	12,926	6,979	6,870	1,689		422
SCIENTISTS	19,627	668	10,123	3,493	4,139	889		315
Biologists	1,014	121	535	319	28	6		5
Mathematicians, statisticians	410	12	246	51	60	29		12
Physical scientists	1,735	306	1,042	200	135	33		19
Chemists, physicists, astronomers	1,619	298	947	193	130	33		18
Geologists, geochemists, geophysicists, paleontologists	73	7	56	7	3	0		0
Meteorologists	41	0	38	0	2	0		1
Other professional occupations in physical science	2	1	1	0	0	0		0
Social scientists	12,730	217	6,703	1,610	3,262	697		241
Psychologists	3,941	193	3,534	50	67	25		72
Econ., econ. pol. researchers & anal.	8,789	24	3,169	1,560	3,195	672		169
Computer systems analysts	3,738	12	1,597	1,313	654	124		38
ENGINEERS	10,049	122	2,803	3,486	2,731	800		107
Mechanical engineers (incl. aero. eng.)	2,256	5	491	855	643	238		24
Electrical engineers	676	5	136	324	174	33		4
Electronics and teletechnical com. eng.	1,853	8	474	612	536	201		22
Chemical engineers	3,987	93	1,366	1,368	964	157		39
Metallurgical, mining and petrol. eng.	161	2	59	15	59	24		2
Other professional engineers n.e.c.	1,116	9	277	312	355	147		16

Source:  
Special Enumeration by Statistics Sweden, from the 1990 Census.

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