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INFORMATION OCCUPATIONS:  
THE NEW DOMINANT  
IN THE  
NEW ZEALAND WORK FORCE

MICHAEL CONWAY

REPORT NO. CFFR1/81  
Classification P.N.

MAY 1981

The views expressed in this paper are those of the author and do not necessarily represent the views of the Commission For the Future.

This paper has arisen out of background research for the Commission For the Future which sought to identify occupational trends within the New Zealand work force and in particular to assess the growth of information occupations.

Dr Marc Uri Porat has defined information workers as those whose income originates primarily in the manipulation of symbols and information. This may be at a high intellectual level (such as the production of new knowledge) or at a more routine level (such as feeding computer cards into a card reader). (1)

On the latest figures available, more New Zealanders are now engaged in information occupations than in any of the other three occupational sectors: agriculture, industry and service.

TABLE 1: Four-Sector Division of NZ Work Force, 1976

Sector	Numbers	Percentages
Information occupations	447,214	35.9
Agriculture, including forestry, logging, fishing*, hunting	129,478	10.4
Industry, including mining and construction	412,200	33.1
Service, including armed services	257,542	20.7
	<u>1,246,434</u>	

A steady and marked increase in the number of information workers has been a major feature of developed economies in recent years, reflecting and to a degree measuring the international trend from industrial to post-industrial (2) societies.

Publications by the United States Department of Commerce and the Organisation for Economic Co-operation and Development (OECD) in particular have analysed the trend and comparative figures are now available for many of the developed nations, as shown in the next table.

\*United Kingdom statistics have included fishing in the industry sector. In New Zealand, fishing includes fish hatching and farming and oyster farming and is under the direction of the Ministry of Agriculture and Fisheries. Persons specifically engaged in fishing in 1976 represented 0.2% of the work force and their transfer to the industry sector would have raised that sector to 33.3% and lowered the agriculture sector to 10.2%.

The trend is led by the United States with the United Kingdom in second position, but it can now be shown that in this aspect of development New Zealand has been keeping pace with other OECD countries.

TABLE 2: Time Changes in Work Force Composition

		Information	Service	Industry	Agriculture
United States	1950	30.5	19.1	38.4	12.0
	1970	41.1	24.1	31.5	3.3
United Kingdom	1951	26.7	27.5	40.4	5.4
	1971	35.6	27.0	34.2	3.2
New Zealand	1956	25.6	21.7	36.2	16.4
	1971	33.7	20.6	34.0	11.6
Australia	1947	22.7	28.1	31.9	17.2
	1971	29.7	30.5	30.7	9.1
Sweden	1960	26.0	26.8	36.5	10.7
	1975	34.9	29.8	30.6	4.7
France	1954	20.3	24.1	30.9	24.7
	1975	32.1	28.1	29.9	9.9
Japan	1960	17.9	18.4	31.3	32.4
	1975	29.6	22.7	33.8	13.9
West Germany	1950	18.3	20.9	38.3	22.5
	1978	33.2	25.9	35.1	5.8

Note: The Australian figures are from Commonwealth statistics. The other overseas figures are from Table BIII, OECD publication DSTI/ICCP/80.10 (1st revision).

The New Zealand figures are based on inventories of New Zealand information occupations derived from the international inventory published by the OECD in working paper DSTI/ICCP/78.4.

Simplified inventories designed for the separation of the New Zealand classified work force into the information, agriculture, industry and service sectors are provided in an appendix to this paper for the census years 1956-1976.

A more detailed inventory of the information sector enabling disaggregation into 12 OECD information subdivisions is provided in respect of the current occupational classifications.

#### DEFINITION OF INFORMATION OCCUPATIONS

While there appears to be no disagreement about Dr Porat's broad definition given earlier in this paper, there are considerable variations between the interpretations of the definition applied by the OECD, by Dr Porat, and by other students of occupational trends such as Barry Jones, Labour Party "shadow minister" in the Australian Parliament. Dr Porat says:

"Stating precisely who is an information worker and who is not is a risky proposition. Obviously, every human endeavor involves some measure of information processing and cognition; intellectual content is present in every task no matter how mundane. It is, after all, the critical difference between humans and animals that the former can process symbolic information quite readily while the latter cannot. There is nothing to be gained by saying that certain occupations have a zero informational content while others are purely informational.

"We are trying to get at a different question: Which occupations are primarily engaged in the production, processing, or distribution of information as the output, and which occupations perform information processing tasks as activities ancillary to the primary function? To make the question clear, is there a qualitative difference on the issue of information between a computer programmer and a carpenter? Both are skilled workers, earning roughly the same salary. Both require a certain amount of education before they can function productively. And both use attention, concentration, and applied knowledge in their respective tasks. However, the programmer's livelihood originates with the provision of an information service (a set of instructions to a computer), while the carpenter's livelihood originates with the construction of a building or a piece of furniture - noninformational goods. The former sells information as a commodity; the latter sells a tangible physical product." (3)

Barry Jones says the information sector provides 'soft' or intangible services and its common element is the processing of symbols and/or symbolic objects.

"Information activities", he says, "include teaching, research, office work, public service, radio, television, films, theatre, photography, posts and telecommunications, newspapers, magazines, book publishing, printing, banking, insurance, real estate, administration, museums and libraries, creative arts, architecture, designing, music, data processing, computer software, selling tickets, accountancy, law, psychiatry, psychology, social work, management, advertising, the church, science, trade unions, and parliaments.

"The symbols used are words, sounds, images and numbers, or symbolic objects which represent tangibles such as money, cheques, letters, speeches, bills, tickets, type, photographs, advertisements, keys, title deeds, legislation or newspapers.

"The tools of trade used by information workers are voices, pens, pencils, chalk, telephones, typewriters, computer keyboards, word processors, duplicators, visual display units, adding machines, microphones, cameras, microscopes and tape recorders." (4)

The OECD inventory does not invariably coincide with the above general definitions or with the occupations specifically listed by Dr Porat (5), and it does not always appear consistent. For example, the OECD inventory classes administrators and library assistants as information workers but excludes librarians.

It seems likely that researchers in other OECD countries will have found difficulty with interpretations such as the above and may have followed Dr Porat and included librarians and some other workers in their information sector in spite of the OECD exclusion, and this course has been adopted by the writer.

However, the overall effect of these variations is relatively slight and the New Zealand figures remain comparable with the OECD inventory.

The following is the writer's overall inventory of information occupations as related to the New Zealand 1971 census returns (6):

NEW ZEALAND INFORMATION OCCUPATIONS: CURRENT INVENTORY

Professional and Technical

Scientist, architect, engineer, surveyor, draughtsman, clerk of works. NOT technician except telecommunications technician.

NOT aircraft or ship's officer.

Medical practitioner, dietician, optometrist and optician, matron. NOT dentist, veterinarian, pharmacist or registered nurse.

Statistician, mathematician (including technician), actuary, computer professional, economist, accountant, lawyer, judge.

Teacher, author, journalist and related writer. NOT minister of religion.

Creative artist including photographer, composer; performing artist, director, producer, announcer, teacher of music or dancing.

NOT professional sportsman or instructor.

Librarian etc, psychologist, sociologist, social or welfare worker, etc.

Administrative and Managerial

Legislator and government administrator, manager except wholesale and retail (included elsewhere) and except farm, catering and lodging. Includes managers of sales, personnel and research and development, and secretary-organiser.

All the workers in this major occupational group as presently constituted are information workers.



Clerical

Clerical supervisors; government executive officials; stenographers, typists, operators of card and tape-punching machines; bookkeepers and wages and finance clerks but NOT cashiers, bank tellers or other money-handlers; computing machine operators; transport and communications supervisors; NOT transport conductors; mail distributors including posties; operators of telephone and telegraph equipment, radio-telephones and aircraft and ship radios; stock, production, general office, correspondence, personnel, legal and insurance clerks, receptionists, travel agency clerks, library and filing clerks, statistical and coding clerks, proof readers, operators of office reproduction machines including photo-offset.

Sales

Manager, wholesale and retail trade. Working proprietor, wholesale but NOT retail.

Sales supervisor and buyer. Technical salesman, manufacturers' and indent agent but NOT commercial traveller.

Insurance salesman, estate and land agent, stockbroker and sharebroker, business services and advertising salesman, auctioneer, wool buyer and dealer, urban and rural valuer or other appraiser, stock and station agent.

News vendor but NOT salesman in wholesale or retail establishment, not model, demonstrator, canvasser or other street vendor.

Service

Housekeeper, house steward, chief ship's steward; head cook or chef (only); private inquiry agent, store detective.

Farm and Forestry

All farm workers considered to be within the agriculture sector; but forest and logging manager and supervisor, forest advisor and logging planner, all included in information sector.

Production and Transport

Supervisor, overseer, foreman; textile fabric examiner; printing machine mechanic and mechanic and serviceman for typewriters, duplicators, calculators and other office machinery.

Radio and television repairman, telephone and telegraph installer and linesman, electrical products inspector and tester.

Broadcasting station operator, cinema projectionist, sound-equipment operator.

Printer except wallpaper printer.

Quality inspector.

TRENDS WITHIN THE NZ INFORMATION SECTOR

From the above inventory, the following table has been constructed showing the number of information workers as returned in the 1971 and 1976 censi. The column on the left refers to the current New Zealand Standard Classification of Occupations (see appendix for detail).

TABLE 3: New Zealand Information Workers, 1971 and 1976

- Notes: (1) Unless otherwise indicated, percentage changes are increases.
- (2) The percentage changes in the various occupations should be related to the following increases from 1971 to 1976 -
- |                                |       |
|--------------------------------|-------|
| (a) Information sector average | 19.9% |
| (b) Work force average         | 12.7% |
| (c) NZ population              | 9.3%  |

(Table 3 cont.)

Occ. code Number	Occupations	Numbers employed		Percent change
		1971	1976	
01	Physical scientists (not technicians)	1 269	1 636	28.9
02	Architects, planners, engineers	8 630	12 381	43.5
03	Surveyors, draughtsmen, clerks of works	7 442	9 050	21.6
0342	Telecommunications technicians	2 887	3 402	17.8
05	Life scientists (not technicians)	1 852	2 219	19.8
0611	General practitioners	1 470	2 032	38.2
0612-9	Other medical practitioners	1 610	2 274	41.2
0690	Dieticians, public health nutritionists	144	228	58.3
0711	Hospital matrons	262	189	-27.9
0750	Optometrists and opticians	229	263	14.8
081,2	Mathematicians, actuaries	200	334	67.0
0830	Systems analysts	385	670	74.0
0841	Computer programmers	929	1 165	25.4
0849	Other statistical, mathematical technicians	24	37	54.2
09	Economists	473	763	61.3
11	Accountants, auditors	7 434	10 570	42.2
12	Lawyers, judges	2 733	3 620	32.5
13	Teachers, lecturers, school inspectors	44 280	53 111	19.9
15	Authors, journalists, publicity writers	2 586	3 028	17.1
16	Artists, designers, photographers	3 640	4 231	16.2
17	Composers, performing artists, teachers thereof	1 311	1 941	48.1
1732,40	Producers, stage directors	235	344	46.4
1791	Radio and television announcers	308	381	23.7
191	Librarians, archivists, curators	862	1 602	85.8
192	Psychologists, other sociologists	152	310	103.9
1931-90	Social workers, etc	2 804	5 725	104.2
	TOTAL IN PROFESSIONAL, TECHNICAL	94 158	121 506	29.0
20	Legislators, government administrators	637	812	27.5
21	Managers, secretary-organisers	27 766	40 096	44.4
	ADMINISTRATIVE, MANAGERIAL TOTAL	28 403	40 908	44.0

(Table 3 cont.)

Occ. code Number	Occupations	Numbers employed		Percent change
		1971	1976	
30	Clerical supervisors, office managers	4 524	7 132	57.6
31	Government executive officials	4 818	5 876	22.0
32	Stenographers, typists	34 392	37 705	9.6
33	Bookkeepers, finance clerks, bank officers	21 281	31 295	47.1
34	Computing machine operators	7 329	7 079	-3.4
35	Transport and communication supervisors	5 998	6 473	7.9
37	Mail clerks, posties, messengers	3 706	3 894	5.1
38	Telephone, telegraph, radio operators	7 139	6 890	-3.5
39	Other clerks, receptionists, library assistants	81 925	90 365	10.3
	TOTAL IN CLERICAL	171 112	196 709	15.0
40	Wholesale and retail managers	18 297	17 846	-2.5
4101	Working proprietors, wholesale and warehouse	460	720	56.5
42	Sales supervisors and buyers	8 882	7 858	-11.5
43	Technical salesmen, agents	2 086	2 303	10.4
44	Insurance salesmen, land agents, valuers, auctioneers, stock and station agents, wool buyers, wool dealers	10 165	11 401	12.2
4524	News vendors and agents	221	301	36.2
	TOTAL IN SALES	40 111	40 429	0.8
52	Housekeepers, chief stewards	3 224	3 050	-5.4
5311	Head cooks, chefs	892	1 444	61.9
5891	Private and store detectives	30	36	20.0
	TOTAL IN SERVICE	4 146	4 530	9.3
63	Forest and logging managers and supervisors	923	1 212	31.3
	TOTAL IN AGRICULTURE	923	1 212	31.3
70	Production etc supervisors	14 157	19 598	38.4
7546	Fabric examiners	199	149	-25.1
84	Office and printing machine mechanics	798	714	-10.5

(Table 3 cont.)

Occ. code Number	Occupations	Numbers employed		Percent change
		1971	1976	
85	Radio and TV servicemen, telephone and telegraph installers and linesmen, electrical products inspectors	5 948	7 687	29.2
86	Broadcasting and sound equipment operators, cinema projectionists	428	502	17.3
92	Printers	10 838	11 249	3.8
9494	Production quality inspectors	1 627	2 011	23.6
	TOTAL IN PRODUCTION	33 995	41 910	23.3
	TOTAL INFORMATION SECTOR	372 848	447 214	19.9
	TOTAL CLASSIFIED WORK FORCE	1 106 025	1 246 434	12.7

The following table shows relative changes within the work force - and, in some cases, lack of significant change. (See economists and accountants.)

TABLE 4: Totals Engaged in Various Information Occupations as Percentages of the Work Force (Excluding the Armed Forces) at the Time of Each Census

	1956	1961	1966	1971	1976
Scientist, physical	0.119	0.118	0.124	0.116	0.132
Scientist, life	0.073	0.112	0.103	0.169	0.180
Architect, planner	0.086	0.099	0.109	0.113	0.137
Engineer, except electrical	0.295	0.309	0.330	0.530	0.695
Engineer, electrical, etc.	0.052	0.049	0.068	0.146	0.171
Doctor	0.276	0.284	0.273	0.281	0.349
Mathematician	0.004	0.006	0.009	0.018	0.027
Computer analyst			Est. 0.004	0.035	0.054
Computer programmer			Est. 0.006	0.085	0.094
Economist		0.005	0.009	0.043	0.062
Accountant	0.892	0.862	0.847	0.679	0.856

(Table 4 cont.)

	1956	1961	1966	1971	1976
Librarian, curator	0.070	0.058	0.066	0.079	0.130
Psychologist		0.005	0.009	0.012	0.022
Social and welfare worker, probation officer	0.056	0.070	0.090	0.133	0.186
Clerical worker	11.722	12.685	13.399	14.029	14.177
Postie, telegram deliverer	0.170	0.170	0.161	0.148	0.143
Telephone, toll operator	0.572	0.598	0.593	0.567	0.493

The following table demonstrates changes in participation by women in various information occupations. It should be noted that with the exception of primary school teachers the largest numbers of women are engaged in occupations currently threatened by the introduction of higher technology: bank clerks, typists, general office clerks.

TABLE 5: The Numbers of Women Engaged in Various Information Occupations and the Percentage (lower line in each case) of those Engaged in Each Occupation who are Women

	1956	1961	1966	1971	1976
Doctor	190 8.5	193 7.7	223 8.1	281 9.1	550 12.8
Lawyer	28 1.4	33 1.6	31 1.3	49 1.8	159 4.5
Scientist	234 15.1	334 15.8	216 9.4	294 9.4	368 9.5
Psychologist		6 15.0	17 18.7	29 22.5	89 33.2
Architect, planner	10 1.4	20 2.3	15 1.4	33 2.7	96 5.7
University teacher	118 16.0	158 15.3	248 14.9	247 13.0	335 13.3
Primary teacher	6 278* 54.1	8 041* 56.3	10 609* 60.6	12 420 67.9	14 561 68.2

(Table 5 cont.)

	1956	1961	1966	1971	1976
Journalist	143 12.4	180 13.9	293 17.0	455 23.4	641 28.8
Social, welfare worker	228 55.9	285 52.2	475 58.2	776 58.6	1 204 58.2
Dietician	90 97.8	109 100	138 99.3	144 100	226 99.1
Librarian, archivist	435 80.7	381 78.9	509 79.7	658 82.3	1 239 84.3
Interior decorator (designer)	20 24.1	33 49.3	44 43.1	51 44.3	106 44.0
Radio, TV technician	8 1.0	12 0.9	43 2.4	5 0.4	21 1.3
Draughting	310 13.9	431 13.5	688 14.8	788 14.3	1 107 16.9
Bank clerk	1 884 35.6	2 004 36.9	2 831 40.0	3 544 44.1	6 823 54.8
Typist	18 372 99.3	20 915 99.5	26 079 99.8	32 669 98.7	35 787 99.0
Travel or booking clerk				927 42.9	1 493 52.4
Office clerk	14 901 49.0	17 408 51.1	22 382 52.2	32 096 59.3	36 752 65.9
Punch card operator				662 97.1	1 052 95.7

\*Department of Education figures. All other numbers from census returns.

DIVISION OF THE WORK FORCE INTO FOUR SECTORS

As shown earlier, OECD statistics feature a four-sector breakdown of occupations.

Agriculture used to be the dominant sector and is still commonly described as primary and sometimes as extractive. It normally includes forestry and in New Zealand also comprehends fishing and hunting. In Australia it includes mining (which engaged 0.6 percent of the Commonwealth work force in 1978).

Industry, or the secondary sector, is classed as production by the New Zealand Department of Statistics and includes mining, construction and some transport work.

Service, or the tertiary sector, used to be the remainder of the work force - and still is, less the information sector.

Information activity, sometimes described as the quaternary sector, has already been defined in detail. In general, it comprises most professional workers, all administrators, most clerical staff and some other workers such as certain specialist sales staff.

Prior to 1976, the NZ Department of Statistics did not include the armed forces among the classified occupations. Now it does, presumably to be in line with overseas practice. The inclusion (wholly within the service sector) somewhat distorts the overall picture because of the information occupations contained within the armed forces. Accordingly, while the writer has included the armed forces within the service sector for comparability with OECD statistics, he has not counted the forces as part of the New Zealand classified work force for internal analyses of occupational trends (as in Table 4).

The method adopted for separating the four sectors using the 1956-1976 census data is set out fully in the appendix. The following table shows the percentage share held by each sector over that period.

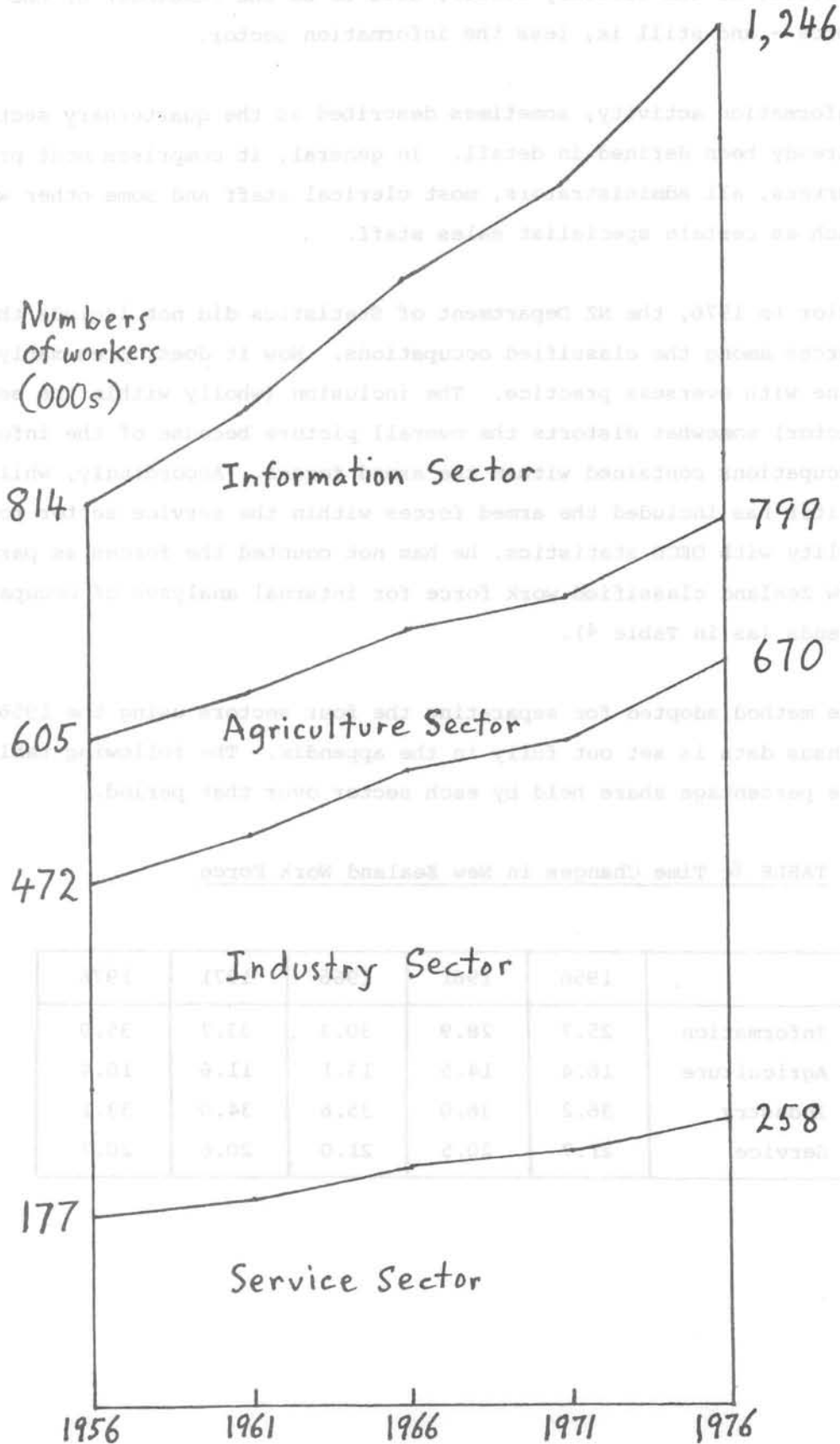
TABLE 6: Time Changes in New Zealand Work Force

	1956	1961	1966	1971	1976
Information	25.7	28.9	30.3	33.7	35.9
Agriculture	16.4	14.5	13.1	11.6	10.4
Industry	36.2	36.0	35.6	34.0	33.1
Service	21.7	20.5	21.0	20.6	20.7



Growth in NZ Classified Work Force 1956 - 1976.

Numbers of workers (000s)



Industry Sector		1956	1961	1966	1971	1976
Information	25.7	38.9	30.1	37.7	34.0	37.0
Agriculture	18.4	14.5	17.1	11.6	10.8	10.8
Service	36.5	16.0	15.6	34.0	31.0	30.0
Industry	21.0	20.5	21.0	20.6	20.0	20.0

REMUNERATION OF INFORMATION WORKERS

APPENDIX

The most useful information the writer has been able to obtain about the remuneration of New Zealand information workers has come from Table 12, NZ Incomes and Income Tax for 1971-72, Department of Statistics.

This table relates tax returns to occupational classes in sufficient detail to enable a four-sector separation. Unfortunately these data are not available in respect of recent years.

It may not be realistic to relate formal remuneration from the rural sector to the remuneration of other occupations and consequently this paper simply compares the average information sector remuneration with the average of the other two sectors.

TABLE 7: Four-Sector Analysis of Relative Remuneration, 1971-72

<u>Sector</u>	<u>1971 Census Return of Workers</u>	<u>Number of Tax Returns*</u>	<u>Average Remuneration per Tax Return</u>
Information	372 848	400 380	\$3 286
Agriculture	128 727	79 090	\$1 735
Industry	376 323	462 690	\$2 916
Service**	216 660	304 780	\$2 081

Average Returned Remuneration

Information occupations only	\$3 286
Industry and service occupations	\$2 584
Information sector remuneration margin	27.2%

\* Includes tax returns from people working less than twenty hours a week or who for some other reason do not appear in the census labour force figures. The low proportion of tax returns in the agriculture sector reflects the fact that many farm workers are unpaid. (Those who assist a relative in a gainful occupation without financial reward are included in the work force for statistical purposes.)

\*\* Excludes armed forces.

A P P E N D I X

As stated in the main text, the inventory of New Zealand information occupations on which this paper is based has been derived from the international inventory published by the OECD.

This relates to the ILO International Standard Classification of Occupations as revised in 1968, which in turn has been adopted (7) in the New Zealand Standard Classification of Occupations as published by the Department of Statistics in 1970 (and subsequently).

Comparisons of the current classifications with the classifications used prior to 1970 are not straightforward.

The New Zealand Department of Statistics has supplied tables for relating 1971 occupational classifications to those used in 1966 and vice-versa, but so many classifications were merged or dis-aggregated in the changeover, and so many cross-overs to and from the information sector were involved, that the writer has been unable to construct a conversion table that adequately segregates the pre-1971 information occupations.

Accordingly, the occupational classifications used in 1966, 1961 and 1956 have had to be inventoried separately, as follows:-

1956 Four-Sector Inventory, Based on Table 8, Vol. 4, Industries and Occupations, 1956 Population Census, NZ Department of Statistics

INFORMATION OCCUPATIONS:

Division 0-1

0000-0300: All except 0007, 0103, 0104, 0109, 0204, 0206, 0209, 0210

0219, 0300

0400-0439: Include only 0405, 0425, 0431

0500-0609: All included

0800-1119: All except 0908

Total information workers 47 599 out of 71 586

Division 2

2000-2309: All except 2114, 2207

2400-2419: Include only 2407, 2410

2500-2909: All except 2501, 2504, 2700, 2709, 2811, 2816

Note: Some retail working proprietors (non-information) are included in the above but are not separable from wholesale working proprietors, managers and others who are classed as information workers.

Total information workers 130 862 out of 138 404

Division 3

3000-3019: Include only 3000, 3006, 3010

3100-3309: All except 3102, 3202, 3205

Total information workers 6 729 out of 66 353

Division 4

4000-4519: Only 4501 and in that classification only managers, taken as wage and salary earners in Table 9 of the same publication.

Total information workers 95 out of 133 599

Division 5

5000-5509: Include only 5005

Total information workers 285 out of 5 312

Division 6

6000-6719: Include only 6104, 6301, 6700, 6703, 6710-6714

6800-6909: All included

Total information workers 9 091 out of 58 165

Divisions 7, 8

7000-7819: Include only 7549, 7553, 7608, 7611

7900-7929: All included

Total information workers 8 925 out of 272 124

Division 9

9000-9629: Include only 9006, 9104, 9107, 9404-9406

9700-9719: All except 9701

Total information workers 5 324 out of 58 636

Total of Information Sector: 208 910 out of 814 201  
= 25.7%

The other three 1956 sectors are obtained as follows:

AGRICULTURE is Division 4 less the information workers  
= 133 599 - 95 = 133 504

INDUSTRY is Division 5 less information (= 5 312 workers less 285 = 5 027)  
plus occupational codes 62 (6 525 workers) and 6608 (20 221 workers) plus  
codes 7000-8329 less information (272 124 workers less 8 925 = 263 199)  
= 5 027 + 6 525 + 20 221 + 263 199 = 294 972

SERVICE is the balance of the classified work force, taken here to include  
the armed forces but not workers whose occupations were unidentifiable  
or not stated  
= 814 201 - (208 910 + 133 504 + 294 972)  
= 814 201 - 637 386  
= 176 815 (including 10 022 armed forces)

1961 Four-Sector Inventory, Based on Table 10, Vol. 4, Industries and Occupations; 1961 Population Census, NZ Department of Statistics

INFORMATION OCCUPATIONS

Division 0

0000-0309: All except 0200 and 0306  
0400-0519: Include only 0400, 0502, 0509  
06, 08, 09: All included  
0A00-0A19: Only 0A00-0A04  
0B00-0B29: All except 0B20  
Total information workers 57 989 out of 83 873

Division 1

All except 1119, 1158, 1172-1180  
Total information workers 46 975 out of 51 383

Division 2

Exclude only 2002-2009, 2218, 2222, 2223, 2230  
Total information workers 111 227 out of 114 566

Division 3

Note: In this census, working proprietors on own account (i.e. not employing labour) in wholesale and retail trade are separated from directors, managers and other proprietors, but wholesale (which is information work) and retail (which is not) are not separated and the policy adopted this time has been to exclude the classification concerned - 3000. See the inventory of Division 2 for 1956 earlier in this paper for the policy adopted in that case.

3000-3219: All included except 3000, 3200

3300-3319: Only 3302 and 3307

Total information workers 9 610 out of 73 439

Division 4

Only 4409

Total information workers 232 out of 129 774

Division 5

Only 5011

Total information workers 255 out of 5 177

Division 6

6200-6509: Only 6201

6600-6619: Include 6600-6605, 6609, 6612

67, 68: All included

Total information workers 12 403 out of 55 788

Divisions 7, 8

7000-7929: Only 7527, 7607, 7614, 7615, 7617

80: All included

Total information workers 13 967 out of 312 042

Division 9

9000-9609: Only 9005, 9100-9102

97: All included

9800-9939: Only 9901, 9916, 9917

Total information workers 5 631 out of 57 016

Total of Information Sector: 258 289 out of 892 910

= 28.9%

The other three 1961 sectors are obtained as follows:

AGRICULTURE is Division 4 less the information workers

= 129 774 - 232 = 129 542

INDUSTRY is Division 5 less information (= 5 177 workers less 255 = 4 922)

plus occupational code 6404 (= 18 841 workers) plus Divisions 7 and 8 less

information (= 312 042 workers less 13 967 - 298 075)

= 4 922 + 18 841 + 298 075 = 321 838

SERVICE is the balance of workers

= 892 910 - (258 289 + 129 542 + 321 838)

= 892 910 - 709 669

= 183 241 (including 9 852 armed forces)

1966 Four-Sector Inventory, Based on Table 10, Vol. 4, Industries and Occupations; 1966 Population Census, NZ Department of Statistics

INFORMATION OCCUPATIONS

Division 0

0001-0309: All except 0200, 0306

0400-0519: Only 0400, 0502, 0509

06, 08, 09: All included

1000-1019: Only 1000-1004

1100-1129: All except 1122

Total information workers 71 268 out of 104 158

Division 1

1500-1689: All except 1619, 1658, 1669, 1672-1680

Total information workers 52 277 out of 60 037

Division 2

All except 2002-2009, 2218, 2222, 2223, 2230

Total information workers 136 574 out of 141 046

Division 3

All of 26 and 27 except 2700

2800-2819: Only 2802, 2807

Total information workers 11 322 out of 84 521

Division 4

Only 3409

Total information workers 242 out of 134 417

Division 5

Only 4011

Total information workers 218 out of 4 235

Division 6

5000-5619: Only 5201, 5600-5605, 5609, 5612, 5619

57, 58: All included

Total information workers 14 168 out of 60 954

Divisions 7, 8

6000-6929: Only 6527, 6607, 6614, 6615, 6617

70: All included

7100-7929: Only 7520

Total information workers 17 196 out of 355 513

Division 9

8000-8609: Only 8005, 8100-8102

87: All included

8800-8939: Only 8901, 8916, 8917

Total information workers 6 253 out of 65 057



Total of Information Sector: 309 518 out of 1 021 038

= 30.3%

The other three 1966 sectors are obtained as follows:

AGRICULTURE is Division 4 less the information occupation

= 134 417 - 242 = 134 175

INDUSTRY is Division 5 less information (= 4 235 workers less 218 = 4 017)

plus code 5404 (21 046 workers) plus Divisions 7 and 8 less information

(= 355 513 workers less 17 196 = 338 317)

= 4 017 + 21 046 + 338 317 = 363 380

SERVICE is the balance of workers

= 1 021 038 - (309 518 + 134 175 + 363 380)

= 1 021 038 - 807 073

= 213 965 (including 11 100 armed forces)

The Four Sectors of the NZ Classified Work Force, 1971 and 1976

INFORMATION sector: Derived as set out in the main text (with details of occupational codes and further separation later in this appendix).

AGRICULTURE sector: Codes 6000-6499 less the information occupations.

INDUSTRY sector: Codes 7001-9919 less the information occupations and less also the following occupations allocated to the Service sector - 9810-9852 and 9855-9899.

SERVICE sector: Balance of the classified work force, taken here as including the armed forces which are coded 9950 in the 1971 statistics and 5830 in the 1976 tables.

Sector	Numbers of Workers	
	1971	1976
Information	372 848	447 214
Agriculture	128 727	129 478
Industry	376 323	412 200
Service	228 127	257 542
TOTAL	1 106 025	1 246 434
(Armed forces included in Service sector	11 467	11 362)

Schedule of Information Occupations by the Codes Currently Used by The New Zealand Department of Statistics

Professional, Technical

All of minor group 01 except 014 (= 0141 - 0149)

All of 02 plus 031, 032, 0332, 0334, 0342

All of 05 except 054

From 06, 07, only 061, 069, 0711, 0750

All of 08-13, 15-17, 19

Administrative and Managerial

All included

Clerical

All of 30-32

From 33, 3311, 3316, 3391-3399

All of 34, 35, 37-39

Sales

All of 40

From 41, only 4101

All of 42

All of 43 except 4321

All of 44

From 45, only 4524

Service

All of 52

From 53 and 58, respectively only 5311 and 5891

Agriculture

From 63, 6311-6313, 6321-6323

Production

All of 70

From 75, only 7546

From 84, 8462, 8481-8489

From 85, 8540, 8560, 8572, 8591

All of 86

All of 92 except 9225

From 94, only 9494

The OECD inventory not only identifies information workers by international occupational classifications but groups them into four divisions and 12 subdivisions. These have been coded as follows for use in the subsequent New Zealand inventory:

OECD Grouping of Information Occupations

A Information Producers

- A1 Scientific and technical
- A2 Market search and co-ordination specialists
- A3 Information gatherers
- A4 Consultative services
- A5 Information producers not elsewhere classified

B Information Processors

- B1 Administrative and managerial
- B2 Process control and supervisory
- B3 Clerical and related

C Information Distributors

- C1 Education
- C2 Communication workers

D Information Infrastructure Occupations

- D1 Information machine workers
- D2 Postal and telecommunications

It may be noted that while the above subdivision is based on earlier work by Dr Porat, it does not include Porat's subdivision of public information disseminators which specifically caters for librarians and their assistants and archivists and curators. This paper has placed these workers in the education subdivision for lack of a more appropriate category.

Current NZ Information Codes with OECD Subdivisions

INFORMATION OCCUPATIONS	SUBDIVISIONS
<u>Professional, Technical</u>	
0110-0139	A1
0211-0219	A4
0221-0299	A1
0310-0319	A3
0320-0329	A4
0332	A3
0334	B2
0342	D2
0511-0539	A1
0611-0619	A4
0711	B1
0750	A4
0810-0829	A1
0830, 0841, 0849	A4
0901-0909	A1
1101-1103, 1109	A4
1104	B3
1211, 1219	A4
1221, 1229	B1
1311-1350, 1399	C1
1391	B1
1392	A3
1510, 1519	A5
1591-1599	C2
1610	A5
1621-1629	A4
1631-1639	C2

1711	A5
1715, 1723	C1
1712-1714, 1719-1722, 1729-1799	C2
1911-1919, 1931-1990	C1
1921, 1929	A1

Administrative and Managerial

2011-2199	B1
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Clerical

3001-3009	B2
3101-3109	B1
3211-3214, 3216, 3219	B3
3215, 3220	D1
3311, 3316, 3391-3399	B3
3411-3429	D1
3510, 3520, 3591, 3592, 3594-3597, 3599	B2
3593, 3598	A3
3701-3809	D2
3911	B2
3912-3993, 3999	B3
3994	D1

Sales

4001-4009	B1
4101	A2
4211-4219	B2
4220-4229	A2
4310, 4322, 4329	A2
4411-4420	A2
4431-4439	A3
4524	C2

Service

5201-5209	B2
5311	B2
5891	A3

Agriculture

6311, 6312, 6321-6323	B2
6313	A3

Production

REVIEWS

7001-7019  
7546  
8462, 8481-8489  
8540, 8560, 8572  
8591  
8610  
8621-8629  
9211-9224, 9229-9299  
9494

B2  
A3  
D1  
D2  
A3  
D2  
D1  
D1  
A3

1. In Murray/Port, Vol. 1, "The Information Economy", published by the US Department of Commerce, p. 3.

2. "A post-industrial society is based on services. What is the new power, or energy, or information?" See "The Information Economy" of Post-Industrial Society, Basic Books, New York, 1971.

3. Ibid, pp 105, 106.

4. R. D. James, Chapter 5, "Services, Knowledge Technology and the Future of Work", Oxford University Press.

5. Ibid, Tables 7-1-7-8.

6. US Census of Population and Dwellings, Vol. 4, "Industries and Occupations", Table 10, 1971.

7. The adoption is marked by many small variations in the code numbers allocated to a range of occupations. For example, computer programmer is coded 0841 by the ILO and 0841 by the ESCO, and wallpaper printer is respectively coded 9237 and 9235.

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1. Dr Marc Uri Porat, Vol. 1, "The Information Economy", published by the US Department of Commerce, p 3.
2. "A post-industrial society is based on services. What counts is not raw muscle power, or energy, but information". Bell, "The Coming of Post-Industrial Society", Basic Books, New York, 1973, p 127.
3. Ibid, pp 105, 106.
4. B O Jones, Chapter 3, "Sleepers, Wake! Technology and the Future of Work", Oxford University Press.
5. Ibid, Tables 7.2-7.8.
6. NZ Census of Population and Dwellings, Vol. 4, "Industries and Occupations", Table 10, 1971.
7. The adoption is marked by many small variations in the code numbers allocated to a range of occupations. For example, computer programmer is coded 0842 by the ILO and 0841 by the NZSCO, and wallpaper printer is respectively coded 9227 and 9225.

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