



2001 Census: Industry Sector(Census Paper No. 04/01)

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ABBREVIATIONS

ABS	Australian Bureau of Statistics
ANZSIC	Australian and New Zealand Standard Industrial Classification
ATSIC	Aboriginal and Torres Strait Islander Commission
CDEP	Community Development Employment Projects
DPC	data processing centre
GNGP	government/non-government (person variable)
HHF	household form
INDP	industry of employment (person variable)
LFSP	labour force status (person variable)
LOG	level of government
NSW	New South Wales
PF	personal form
QM	quality management
SIF	special Indigenous forms
TOLO	type of legal organisation
WSE	Wage and Salary Earners (survey)

1.1 MAIN FINDINGS

Analysis of the 2001 Census data for Industry Sector reveals a number of issues which had an impact on the data quality, such as the form and question design, enumeration strategies, collection methodologies, and data processing procedures.

The key findings of the Paper are:

- The Non-response rate to the Business name question was 2.4%, the same as in 1996.
- The Business name index used in the 2001 Census was inadequate to achieve the correct code for a number of organisations, especially in the government sector.
- The absence of a classification category for Other or Inadequately described responses forced a number of businesses to be dump-coded into the private sector by default. This affected the data quality of the government and private sector.
- Between 1996 and 2001, there was a 1.1% decrease in the number of government employees and 10.7% increase in the number of private employees. In the same period the number of Community Development Employment Projects (CDEP) employees increased by 61%.
- Within the private sector, the largest intercensal increase occurred in the Property and Business Services industry. In the government sector, an eight fold jump in the number of Commonwealth government employees was noticed in the Education industry due to a change in the coding of university employees, from State/Territory government in 1996 to Commonwealth government in 2001.
- Three out of four respondents employed in the CDEP sector have been coded to the Government Administration and Defence industry. An internal review of the CDEP coding in the 2001 Census showed that a large proportion of these respondents had been coded to the Local Government Administration due to inadequate CDEP information provided by respondents on census forms.

Key recommendations for the 2006 Census:

- Prepare a better Business name index to improve the coding of government sector data.
- Include a new category called Other to include businesses that could not be coded to government or private sectors.
- Remove the CDEP category from the Industry Sector classification allowing employers of Indigenous CDEP participants to be correctly coded to one of the other categories. Concurrently, effort should be made to collect CDEP specific data from Indigenous people through better form and question design and collection procedures
- Checks are put in place to ensure all edits work as specified.

1.2 INTRODUCTION

1.2.1 *About Census Papers*

The Australian Bureau of Statistics (ABS) has a stated, corporate objective to provide the means for informed and increased use of statistics. This Paper is one of a series produced after each census by the Australian Bureau of Statistics' Population Census Evaluation Team, whose role is to review the data quality of the 5 yearly Census of Population and Housing. The aim of a Census Paper is to inform users of issues that have been identified as impacting on the quality of the census data. Analyses such as these are a critical factor in the continuous quality improvement of the Census Program. The ABS welcomes your feedback and suggestions.

1.2.2 *This Paper*

Data on the Industry Sector (referred in census outputs as Government/Non-government) in which people are employed is of interest to many census data users. For example, Industry Sector, in combination with other industry and occupation characteristics, can provide a more complete picture of the dynamics of the employed at small area and small population levels. Time series analyses, for example, can reveal the movement of employees across industry sectors.

The purpose of this report is to:

- Evaluate the quality of the Industry Sector data from the 2001 Census and inform internal and external users of Industry sector data issues
- Recommend improvements to the question design, data processing procedures, and the index to achieve improved data quality in the 2006 Census.

In the census, the coding procedure for Industry Sector is directly related to the coding of Industry of Employment. Readers of the Industry Sector Paper are recommended to use this report in conjunction with the 2001 Census Paper on Industry (Ref: 2001 Census: Industry. Census Paper No. 03/08) for more complete information on data processing.

1.2.3 *Definitions*

In census outputs, all Industry Sector responses are reported under 5 broad Industry Sector classification categories:

- 1 Commonwealth government
- 2 State/Territory government
- 3 Local government
- 4 Private sector
- 5 Community Development Employment Projects (CDEP).

In addition, the output also contains three other categories:

- Not stated
- Not applicable
- Overseas visitor.

2.1 QUESTION DESIGN

In the census, Industry Sector is not directly collected from respondents but derived from the business name of their employers. In the 2001 Census, respondents 15 years or older were asked to write the business name of their employers in Q36 in the Household Form (HHF) or Q37 in the Personal Form (PF) or Q32 in the Special Indigenous Form (SIF) (Figures 1a & 1b). The question was also accompanied by bullet point examples to assist people in writing a correct response. Further, the question was placed as part of a logical sequence of questions relating to industry and occupation, enabling people to answer the question with minimum effort.

The design, wording and formatting of the question in the 2001 Census did not differ greatly from the 1996 Census.

FIGURE 1a: THE 2001 CENSUS QUESTION USED TO DERIVE INDUSTRY SECTOR DATA ON HOUSEHOLD FORM AND PERSONAL FORM

<p>36 For the main job held <i>last week</i>, what was the employer's business name?</p> <ul style="list-style-type: none"> • For self-employed persons, print name of business. • For teachers, print name of school. 	<p>Business name</p> <table border="1" style="width: 100%; height: 40px;"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																																																												

FIGURE 1b: THE 2001 CENSUS QUESTION USED TO DERIVE INDUSTRY SECTOR DATA ON SPECIAL INDIGENOUS FORM

<p>32 Who did you work for <i>last week</i>?</p> <ul style="list-style-type: none"> • If it is the community, give the community's name. • If funded by CDEP also write 'CDEP'. • If they worked for themselves, write name of business. <p>Name of business</p> <table border="1" style="width: 100%; height: 40px;"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																																																												

3.1 CODING PROCEDURES

The coding for Industry Sector in the 2001 Census was simple; coders typed in the first three letters of all words in the business name and look for a match from the Business name index displayed on a computer screen. If a match was not found from the index, then the respondent was allocated the code for Private industry sector. If a business name provided by a respondent (e.g. Department of Family Welfare) points to the possibility of any one of the three government sectors, then Commonwealth government took precedence over State/Territory government, which in turn took precedence over Local government in coding. If a business name was not provided then Industry Sector was set to Not stated.

The Industry Sector coding of respondents in mainstream forms (HHF and PF) was derived solely from the business name of their employers. But for Indigenous Australians enumerated in SIF the Industry Sector codes for CDEP responses were derived from the business name of the employer (Q32) (Figure 1b) as well as from any CDEP related information found in Q29 and Q34 (Figure 2).

FIGURE 2: ADDITIONAL QUESTIONS ON THE SPECIAL INDIGENOUS FORM USED TO DERIVE COMMUNITY DEVELOPMENT EMPLOYMENT PROJECTS DATA, 2001 CENSUS

29 Did you have a paid job *last week*?

- Mark one box only.
A job means any type of work including casual or temporary work or part-time work, if it was for one hour or more.

Yes, worked - CDEP

Yes, worked other than CDEP

Yes, worked in own business

Yes, but off work on holidays, sick leave, sorry business.

No, did not have a job ► **Go to 37**

34 What work does your employer do?

- For example, raising cattle, community services, community council, mining.
- If worked for CDEP write 'community council'.

3.2 INDEXES USED IN CODING

The Business name index is a compilation of a comprehensive list of non-private and other business organizations such as Commonwealth, State/Territory, and Local government departments, public schools, public hospitals, etc. The Business name index, like other census indexes, requires continuous updates to reflect the changes occurring in public and other non-private business organizations in Australia. However, unfortunately due to the number and complexities of organizational structures, the Business name index may not include every single relevant business entity in Australia. In addition, due to time constraints, for example, businesses that were privatized immediately prior to a census may have still been listed as a public entity in the index.

In the 2001 Census difficulties also arose in coding certain government sector organizations. For example, in the 1996 Census all universities except the Australian National University were coded to State/Territory government based on the ownership but in the 2001 Census it was resolved to code all universities to Commonwealth government. The change occurred due to the difference in the way universities are treated in Australian business registers. The Inteframe, for instance, lists universities at Commonwealth government level based on their LOG (Level Of Government) but at State/Territory level based on their TOLO (Type Of Legal Organization). LOG classifies an entity according to its role (universities implement Commonwealth government education policies) whereas the TOLO classifies an entity according to its ownership. In the 1996 Census, universities were coded to State/Territory government based on their TOLO but this was found to be highly unsatisfactory and inconsistent. Therefore, in the 2001 Census it was resolved to code the universities to Commonwealth government based on their LOG.

The list of public schools in the index was not complete, requiring an update for public schools during 2001 Census data processing. However, in spite of the best efforts by Data Processing Centre (DPC) staff, the index was believed to be not up-to-date and comprehensive enough to achieve correct coding of all business names stated by respondents in the 2001 Census forms.

3.3 EDITS APPLIED TO THE DATA

The ABS Census program has a minimalist editing approach, with most data output as reported on census forms. However, editing is the systematic way of altering data to ensure that it is:

- more complete. For example, if the basic demographic variables of age, sex or usual residence are not stated, they are imputed based on known distributions;

3.3 EDITS APPLIED TO THE DATA *continued*

- socially consistent to some extent. For example, age edits do not allow five year olds to be attending high school; and
- consistent with ABS classifications used in other ABS collections. For example, Census labour force status is derived using the same derivation used in the Labour Force Survey, to allow clients to more accurately compare data.

The edits used in deriving Industry Sector codes in the 2001 Census were applied to ensure that:

- (1) Those who stated their Labour Force Status as Employee or Contributing family worker are set to GNGP = 'Not stated', if they haven't written the business name of their employers.
- (2) Those who stated their Labour Force Status as Employer or Own account worker are set to GNGP = Private. This edit was not always applied - See Section 4.3.
- (3) Persons assigned one of the three Australia and New Zealand Standard Industrial Classification (ANZSIC) 4-digit codes within the Government Administration and Defence division of industry (INDP), are coded to the same level of government in the Industry Sector even if the business names of their employers indicate otherwise.

3.4 QUALITY MANAGEMENT

A Quality Management (QM) system was established to identify systematic discrepancies in processing, provide feedback to coders on discrepancies, and produce and analyse discrepancy rates by topics.

3.4.1 *The QM Process*

QM processing takes a sample of each coder's work, plus samples of codes resulting from data capture and automatic coding, for duplicate coding by a second coder. When the original code and second code differ, both outcomes are written to a mismatch file. These mismatches are then recoded for a third time, by an adjudicator, who determines which is the correct code. When the adjudicator determines a code that differs from the original and/or second coder, a discrepancy is recorded for that source. In some cases the adjudicator may determine both are incorrect, and both will have a discrepancy recorded. A report of these discrepancies is fed back to the relevant coder, or process, so that retraining can be done, or systems updates can be made.

3.4.2 *Discrepancy Rates*

In the majority of cases, the data is not corrected as a result of this sampling. The aim is to improve the coder or process so that such errors do not reoccur. Discrepancy Rates therefore show error rates that are very close to those existing in the final data. The discrepancies are also aggregated into the Management Information System reports which provide data on the types and frequencies of coding errors over time.

The QM system in place during processing allowed the detection of discrepancies and the calculation of a crude discrepancy rate. This crude discrepancy rate differs from a true discrepancy rate for the following reasons:

- a higher proportion of 'poor' coders' work was included in the quality monitoring sample;
- the QM check coders could make the same mistake as the original coder and therefore an error would not be detected;
- there is not always an absolutely correct code for every response; and

3.4.2 Discrepancy Rates *continued*

- discrepancies were recorded for any difference in coding between the QM coder and the original coder.

The DPC routinely reviewed between 10% and 50% of automatic and manual coding. This practice was ongoing, though, particularly with a 'human' coder, the percentage chosen for review varied depending on their performance. In this way, a measure of quality could be made, and extra training or ongoing support provided if a staff member was having continuing problems. Automatic processes were also continuously monitored.

3.4.3 Discrepancy Rates *in final data*

There would invariably have been errors that coders or systems would have made that were repeated by the QM coders - therefore ensuring that further reviews of adjudication never occurred. Such occurrences, however, would have been small - no doubt less than the confirmed Discrepancy Rate. Balancing out this aspect was the greater scrutiny of coders experiencing difficulty.

In the 2001 Census, of the 8,298,606 Industry Sector records 1,177,028 (14.2%) were coded a second time by QM coders. Of these, 21,994 (1.9%) were discrepancies identified by adjudicators.

A break up of the type of discrepancies showed that

- 59% of discrepancies were due to coders coding to Private when in 72% of these cases adjudicators coded to State government and in a further 20% of cases adjudicators coded to Commonwealth government.
- 20% of discrepancies were due to coders coding to State government when in 83% of these cases adjudicators coded to Private and in a further 15% of these cases adjudicators coded to Commonwealth government.
- 11% of discrepancies were due to coders coding to Commonwealth government when in 62% of these cases adjudicators coded to Private and a further 37% of these cases adjudicators coded to State/Territory government.

4.1 INTRODUCTION

The following section contains an analysis of the Industry Sector data from the 2001 Census. Evaluation focused on:

- Non-response
- Comparison with Labour Force Status
- Relationship with Industry of Employment
- Community Development Employment Projects (CDEP).

4.2 NON-RESPONSE ANALYSIS

In the 2001 Census, data for 8,298,606 persons were considered for Industry Sector analysis after the exclusion of the Not Applicable categories.

Of the 8,298,606 respondents, 97.6% were enumerated in HHFs, 2.2% in PFs and 0.2% in SIFs (Table 4.1).

4.1 NUMBER OF INDUSTRY SECTOR PERSONS ENUMERATED IN DIFFERENT CENSUS FORMS, 2001 CENSUS

<i>Form type</i>	<i>Number of persons</i>	<i>% of persons in total</i>
Household Form (HHF)	8 096 614	97.6
Personal Form (PF)	183 568	2.2
Special Indigenous Form (SIF)	18 424	0.2
Total	8 298 606	100.0

Of the 8,298,606 persons relevant to the analysis, 97.6% provided an answer that could be coded to one of the five Industry Sectors (Table 4.2). The non-response rate was 2.4% which was similar to the non-response rates for several other variables in the 2001 Census.

Within Industry Sector, 81.1% were coded to the Private sector, 10% to State/Territory government, 4.7% to the Commonwealth government, 1.5% to Local government, and 0.2% to the CDEP (Table 4.2). This shows that 16.2% of these respondents worked in one of the three government sectors.

4.2 NON-RESPONSE
ANALYSIS *continued***4.2** INDUSTRY SECTOR RESPONSE AND NON-RESPONSE OF
EMPLOYED PERSONS, 2001 AND 1996 CENSUSES

GNCP category	NUMBER OF PERSONS		% OF TOTAL	
	2001	1996	2001	1996
Commonwealth government	392 796	364 586	4.7	4.8
State/Territory government	827 410	862 855	10.0	11.3
Local government	125 341	133 402	1.5	1.8
Total government	1 345 547	1 360 843	16.2	17.8
Private	6 731 113	6 080 136	81.1	79.6
CDEP	19 769	12 276	0.2	0.2
Total response	8 096 429	7 453 255	97.6	97.6
Non-response	202 177	183 064	2.4	2.4
Total	8 298 606	7 636 319	100.0	100.0

4.2.1 Comparisons with
1996

The number of persons considered for Industry Sector analysis (employed persons) in 2001 (8,298,606) was 8.7% higher than their number in 1996 (7,636,319). The 2.4% non-response rate in 2001 was the same as in 1996. An intercensal comparison of the five Industry Sector categories showed a decrease in the number of employees in the State/Territory government and Local government sectors in 2001 (Table 4.2). However, the decreases were compensated by an increase in the number of employees in the Commonwealth government and Private industry in 2001. In percentage terms, the CDEP sector showed the greatest increase (61%) in 2001 although in real terms this was an increase of 7,493 persons.

4.3 INDUSTRY SECTOR
AND LABOUR FORCE
STATUS ANALYSIS

A cross tabulation of the 2001 Census data for Industry Sector with Labour Force Status (LFSP) shows that 2,709 persons who declared working for the government also said that they were Employers or Own account workers or Contributing family workers (Table 4.3). Obviously the edit to remove some of this inconsistency (see Section 3.3) was not always applied. However, this represents only 0.2% of the government workers.

Among those who declared their LFSP as Contributing family worker about one in three did not write the name of the business to which they contributed their labour (Table 4.3). It is possible that these people contributed work for families that did not have a business name.

4.3 A CROSS CLASSIFICATION OF INDUSTRY SECTOR AND LABOUR FORCE STATUS, 2001 AND 1996 CENSUSES

	EMPLOYEE		EMPLOYER		OWN ACCOUNT WORKER		CONTRIBUTING FAMILY WORKER		TOTAL	
	2001	1996	2001	1996	2001	1996	2001	1996	2001	1996
<i>GNGP</i>										
Commonwealth government	391 937	364 124	165	5	388	24	306	433	392 796	364 586
State/Territory government	826 368	861 613	120	6	475	11	447	1 225	827 410	862 855
Local government	124 533	133 167	133	—	607	7	68	228	125 341	133 402
Total government	1 342 838	1 358 904	418	11	1 470	42	821	1 886	1 345 547	1 360 843
Private	5 278 524	5 389 010	577 632	194 544	835 300	442 156	39 657	54 426	6 731 113	6 080 136
CDEP	19 760	12 273	—	—	—	—	9	3	19 769	12 276
Not stated	182 432	161 213	—	68	—	193	19 745	21 590	202 177	183 064
Total	6 823 554	6 921 400	578 050	194 623	836 770	442 391	60 232	77 905	8 298 606	7 636 319

— nil or rounded to zero (including null cells)

Note: Small numbers in some cells have may been randomly adjusted to avoid identification.

4.3.1 Comparisons with 1996

In 1996 as in 2001, a small number of Industry Sector respondents (1,939 persons) said that they worked for the government but also declared their LFSP as Employers or Own account workers or Contributing family workers (Table 4.3). The largest intercensal change occurred in the number of people declaring their LFSP status as Employers or Own account workers in the private industry sector. In 1996, only 194,544 were Employers in this sector but their numbers jumped nearly three fold to 577,632 in 2001 (Table 4.3). Similarly, the number of Own account workers nearly doubled from 442,156 in 1996 to 835,300 in 2001. Such an increase apparently occurred for the two LFSP categories in the 2001 Census due to the differences in the LFSP question format (see the 2001 Census Paper: Labour Force Status. Census Paper No. 03/05 for a detailed explanation on the question differences between the two censuses and the effect on results).

4.4 INDUSTRY SECTOR AND INDUSTRY OF EMPLOYMENT ANALYSIS

A cross tabulation of the Industry Sector and the Industry of Employment shows that as much as 62.7% of respondents working in the CDEP sector were coded to the Government Administration and Defence, ANZSIC Group M (Table 4.4). The proportion is higher among SIF respondents - three out of four respondents employed in CDEP sector have been included in Government Administration and Defence. A review of the coding of CDEP respondents in the 2001 Census confirmed that a large number of CDEP respondents were coded to the Local Government Administration (ANZSIC 8113) due to non-availability of sufficient information from Indigenous communities.

4.4 INDUSTRY SECTORS AND INDUSTRY OF EMPLOYMENT, 2001 AND 1996 CENSUSES

Industry	COMMONWEALTH. GOVERNMENT		STATE/ TERRITORY GOVERNMENT		LOCAL GOVERNMENT		PRIVATE		CDEP	
	2001	1996	2001	1996	2001	1996	2001	1996	2001	1996
Agriculture, Forestry and Fishing	614	338	5 753	5 281	384	320	316 642	313 483	469	146
Mining	56	46	829	1 252	61	154	73 403	84 297	4	—
Manufacturing	3 426	3 483	3 266	3 732	530	516	986 928	950 254	186	12
Electricity, Gas and Water supply	356	601	27 027	29 537	3 951	3 976	29 015	24 458	6	—
Construction	732	1 088	10 803	9 944	8 388	4 318	527 753	461 981	346	30
Wholesale trade	791	750	1 457	727	206	282	429 825	442 450	76	3
Retail Trade	1 748	811	5 370	1 261	537	398	1 188 939	1 026 236	416	46
Accom, Cafes and Restaurants	1 688	393	2 553	2 755	355	758	399 443	348 223	66	5
Transport and storage	5 212	7 256	33 775	42 470	1 343	1 508	310 901	277 608	67	3
Communication services	72 805	107 217	517	334	40	21	74 010	41 922	4	—
Finance and insurance	4 565	6 752	6 246	6 352	130	78	298 636	281 947	25	3
Property and business services	19 190	25 921	28 673	27 365	1 661	1 189	859 279	688 649	779	146
Govt admin and Defence	167 796	172 470	96 399	100 257	84 544	87 511	8 145	7 253	12 390	4 924
Education	89 783	10 697	273 133	329 047	1 227	2 274	226 598	194 667	382	130
Health and community services	8 938	13 541	242 991	219 061	8 330	13 364	532 573	466 747	1 499	6 087
Cultural and recreational services	9 096	7 628	14 683	15 276	8 671	13 791	167 608	140 711	149	24
Personal and other services	4 524	4 557	70 754	66 666	4 126	2 434	215 434	200 493	2 189	536
Non-classifiable units	397	274	707	545	187	205	37 695	85 789	84	37
Not stated	1 079	763	2 474	993	670	302	48 286	42 968	632	139
Total	392 796	364 586	827 410	862 855	125 341	133 402	6 731 113	6 080 136	19 769	12 271

— nil or rounded to zero (including null cells)

Note: Small numbers in some cells may have been randomly adjusted to avoid identification.

4.4 INDUSTRY SECTOR AND INDUSTRY OF EMPLOYMENT ANALYSIS *continued*

While the Industry Sector data shows a total of 1,345,547 persons employed in the three government sectors, the number of persons coded to the Government Administration and Defence industry group was only 369,274 (Table 4.4). The apparent discrepancy was due to the difference in the way these two questions treated people working in government organizations. In Industry Sector, all respondents who declared their employers as publicly owned organizations were classified into the government sector (e.g. public schools, public hospitals, Telstra, NSW Rail, etc.), whereas in Industry of Employment, respondents working for government organizations were assigned codes for different ANZSIC industries depending on the types of goods or service these government organizations produced. For example, in Industry Sector a public school teacher and a public transport driver were both coded to government sector, but in Industry of Employment these two persons were coded to Education industry and Transport industry, respectively.

The analysis also showed that of the 202,177 non-respondents to the business name question 91,472 (45.2%) did not provide sufficient information to code their Industry of Employment either.

4.4.1 Comparisons with 1996

Many ANZSIC industries showed small intercensal changes in the Industry Sector. However, very large intercensal changes occurred in some ANZSIC industries, especially for respondents in the Commonwealth government, State/Territory government, and Private sector. For example, the number of Commonwealth employees in the Communication Services industry declined by 32% from 107,217 in 1996 to 72,805 in 2001 (Table 4.4). However, the decline was compensated by a matching increase in the Private sector.

In 2001, the largest intercensal increase in the number of employees (170,630) occurred in the Property and Business Services industry within the Private sector.

The largest percentage of growth occurred among Commonwealth government employees in the Education industry, an eight fold jump over 1996 (Table 4.4). The change occurred mainly due to a change in coding rules for Industry Sector respondents in universities. In the 1996 Census, these respondents were coded to State/Territory government (Refer to discussion on this issue in Section 3.2). This is evident by a parallel drop in the number of State/Territory government employees in 2001 in the Education industry.

Large intercensal changes also occurred for some ANZSIC industries in the CDEP sector. For example, the number of people reported working in the CDEP sector and coded to Government Administration and Defence increased from 4,924 in 1996 to 12,390 in 2001. The number of CDEP sector employees working in the Health and Community Services dropped from 6,087 in 1996 to 1,499 in 2001. While such changes in some industries might reflect real changes occurring in the CDEP sector during the 5 year period, some intercensal differences were probably due to the difficulty in coding CDEP respondents. In the 2001 Census, for example, a large number of CDEP employees were coded to Local Government Administration (ANZSIC 8113) due to a lack of sufficient CDEP information from these respondents. In 2001, there was also up to a four fold increase in CDEP persons coded to industries such as Manufacturing, Construction, Retail Trade, and Property and Business Services. Although their numbers were small these increases were probably due to the increased diversification of CDEP services and the rapid growth in the number of people engaged under CDEP in these industries.

4.5 INDUSTRY SECTOR DATA ANALYSIS OF INDIGENOUS PERSONS

The ABS uses a different enumeration strategy for Indigenous people living in discrete and remote communities. Two major features of the census Indigenous enumeration strategy are the use of a Special Indigenous Form and the interviewer based enumeration. For operational reasons, however, Indigenous people living in urban and non-discrete communities were normally enumerated in mainstream forms.

A comparison of the distribution of Industry Sector responses between Indigenous and non-Indigenous populations shows a substantially lower level of employment of Indigenous people in the Private sector (Table 4.5). In 2001 Census, four out of five non-Indigenous persons worked in the Private sector. The proportion was only one in two for Indigenous people. As a percentage of their total population, a greater proportion of Indigenous people also worked in the three government sectors compared to non-Indigenous people. In the CDEP sector, however, a substantially higher proportion of Indigenous people were employed compared to non-Indigenous

4.5 INDUSTRY SECTOR
DATA ANALYSIS OF
INDIGENOUS PERSONS
continued

people, as the program is designed to encourage employment activities in Indigenous communities.

4.5 A COMPARISON OF INDUSTRY SECTOR EMPLOYMENT OF
INDIGENOUS AND NON-INDIGENOUS PEOPLE, 2001 CENSUS

<i>Industry Sector</i>	<i>Indigenous persons</i>		<i>Non-Indigenous persons</i>		<i>Not stated</i>	<i>Total persons</i>
	<i>no.</i>	<i>% of total</i>	<i>no.</i>	<i>% of total</i>		
Commonwealth government	6 426	6.4	384 650	4.7	1 720	392 796
State/Territory government	13 164	13.1	810 708	10.0	3 537	827 409
Local government	3 810	3.8	120 789	1.5	742	125 341
Private	55 046	54.8	6 634 255	81.5	41 813	6 731 114
CDEP	17 805	17.7	1 900	—	64	19 769
Not Stated	4 142	4.1	192 184	2.4	5 851	202 177
Total	100 393	100.0	8 144 486	100.0	53 737	8 298 606

— nil or rounded to zero (including null cells)

In the 2001 Census, many CDEP sector participants may have been coded to Local Government Administration (ANZSIC 8113) due to lack of sufficient information supplied by respondents in the SIF. An analysis of the Government Administration and Defence industry supports this assumption. In 2001, of the 14,552 Indigenous persons enumerated as CDEP participants in SIFs, 10,924 have been coded as employees of Local Government Administration.

A State/Territory comparison of CDEP participation of Indigenous people shows that Northern Territory tops the list followed by Queensland, Western Australia and South Australia (Table 4.6). In New South Wales, a far greater proportion of Indigenous CDEP respondents were based in major cities and urban areas. The reverse was the case in Northern Territory, Queensland, Western Australia and South Australia. Among the major states, Victoria did not use SIFs.

4.5 INDUSTRY SECTOR
DATA ANALYSIS OF
INDIGENOUS PERSONS
continued

4.6 THE CDEP EMPLOYMENT OF INDIGENOUS PEOPLE BASED ON REMOTENESS INDEX IN STATES/TERRITORIES, 2001 CENSUS

<i>State/Territory</i>	<i>Remote</i>	<i>Major cities</i>	<i>Urban</i>	<i>Total</i>
New South Wales	481	183	1 107	1 772
Victoria	—	6	170	176
Queensland	3 637	40	1 246	4 923
South Australia	934	42	228	1 204
Western Australia	4 107	78	360	4 545
Tasmania	14	—	8	22
Northern Territory	5 033	—	121	5 155
Australian Capital Territory and other Territories	—	7	—	7
Total	14 206	356	3 241	17 805

— nil or rounded to zero (including null cells)

Note: Small numbers in some cells may have been randomly adjusted to avoid identification.

4.5.1 *Industry sector data analysis of Community Development Employment Projects (CDEP) participants*

Of the five Industry Sector categories used in the 2001 Census, the CDEP sector was reportedly the most difficult to code to, and as a consequence is of dubious data quality.

An internal review conducted by Census Evaluation following the 2001 Census reported a number of concerns raised by several CDEP data users about the coverage of Indigenous participants and the quality of CDEP data from the 2001 Census. In particular, most users acknowledged that census data did not provide sound coverage of urban CDEP participants, citing only 60% were measured this way, but that remote and very remote areas had better results.

The review noted that there are a number of issues (e.g., concepts, form design, data collection, business name index, and data processing procedures) that may have contributed to deficiencies in CDEP data quality in the 2001 Census:

Collection strategies

The Census used different enumeration procedures for Indigenous people - those living in urban communities were self-enumerated whereas Indigenous people living in remote and discrete communities were enumerated by personal interviewers with Indigenous backgrounds.

Form design

Indigenous Australians were enumerated in two different census forms - those living in urban areas were enumerated in mainstream forms while those living in remote and discrete communities were enumerated in the SIFs. Further, states such as Victoria used only mainstream forms for all its Indigenous people.

The Industry Sector questions and instructions were different in the two form types. The SIFs contained instructions which specifically advised Indigenous respondents to write whether they were employed by a CDEP agency. The mainstream forms did not have this instruction.

Processing

4.5.1 Industry sector data analysis of Community Development Employment Projects (CDEP) participants continued

At the Data Processing Centre (DPC), the two form types were processed differently. The CDEP coding of Indigenous people in mainstream forms was done the same way as for the rest of the Australian population by the same coding staff. Most of these coding staff were from non-Indigenous backgrounds, had limited knowledge of CDEP organisations, and did not receive any special training for CDEP coding. However, the CDEP coding of Indigenous people in SIFs was done by a special team of coders who were either knowledgeable about CDEP organisations or had received special training to look for/query additional information to achieve a better CDEP coding outcome.

In the mainstream forms CDEP was coded using information obtained from only one question i.e the business name of the employer. However, in SIFs apart from the employer's business name any CDEP related information found in other industry and occupation responses, were used for CDEP coding.

The Business name index used in the 2001 Census did not contain a complete or up-to-date list of all CDEP organisations in Australia, forcing some CDEP participants to be coded to other industry sectors, notably to Local government.

Conceptual

The Australian Indigenous communities are the predominant participants in CDEP, therefore any difficulties in the enumeration of these people would affect the quality of the CDEP data.

Conceptual problems such as what constitutes CDEP work may have also caused some data quality problems. For example, according to the census, students are excluded from CDEP because studies do not constitute employment. But in reality some CDEP participants were full-time students in schools or vocational studies.

CDEP participants also often consider that they are unemployed or working for the government or a community organisation.

Some CDEP participants may not be aware of their employment arrangement. For instance, some people employed by CDEP agencies are regularly outsourced to work for other employers which makes it difficult for participants to know who their actual employers are.

At times, some CDEP beneficiaries do more than one type of work, work for more than one employer, and work for different number of hours for each employer in a week. This creates difficulty for respondents to report their CDEP employer details in the census form. The SIF form, for example, does not ask respondents to tell what their main job was, therefore, the response on the form may not necessarily be accurate.

In general terms, the inclusion of CDEP as a category in Industry Sector is incorrect, as CDEP is basically a funding stream that can be allocated to approved business which can be in the Private Sector or in any Government Sector. In 2001 (and previous censuses which produced CDEP data) the coding process forced a 'CDEP' response over a more correct definitional response that could have been obtained using the business name (e.g., many Local Government organisations receive CDEP funds for a program).

4.6 COMPARISON WITH
OTHER DATA SOURCES

The ABS conducts several surveys to measure the characteristics and dynamics of the Australian labour force. However, the scope, coverage, frequency, and methodology of these surveys differ from those of the population census. For example, the census measures key labour force characteristics of every single eligible individual, whereas in other employment surveys such as the Wage and Salary Earners Survey (WSE) estimates are based on a sample. Another important difference is that in the census counts the number of persons who have a job, whereas the WSE survey counts the number of jobs. Notwithstanding such differences, a comparison was made to see if the census counts of employees broadly agreed with the employee counts obtained in the WSE survey for August 2001 (Ref: 6248.0 ABS Wage and Salary Earners Survey).

The results (Table 4.7) show that the number of employees counted in the 2001 Census was lower for the two major sectors - Government and Private. The census counted 176,162 fewer employees in the three government sectors, about 12% less than in the WSE survey. The lower number of employees in the Education industry accounted for more than half of the deficit in the census for the government sector. Health and Community Services and Government Administration and Defence were also significant contributors to the shortfall in the census.

The difference in the number of employees in the Private sector was even higher. The census counted 1,028,670 fewer employees in this sector compared to the WSE survey. While a wider range of industries accounted for the difference in the Private sector, the Property and Business Services industry contributed to nearly half the difference. Other significant contributors to the shortfall were Wholesale Trade, Retail Trade, and Health and Community Services.

Overall, the Census counted 984,604 fewer employees than in the WSE survey. The difference in the total number of employees between the census and the WSE survey is consistent with similar differences observed between the 2001 Census and ABS Labour Force Survey for 2001 August. The census recorded 826,796 fewer employees than in the Labour Force Survey.

The 2001 and 1996 Census Papers on Labour Forces Status contain detailed discussions on the possible reasons for the discrepancies between the census and the Labour Force Survey (Ref: 2001 Census: Labour Force Status. Census Paper No. 03/05 & 1996 Census: Labour Force Status. Census Working Paper 99/2). The discrepancies, according to these reports arise from differences in areas such as the scope, coverage, timing, collection methodology, treatment of non-response, sampling and non-sampling errors etc.

4.7 A COMPARISON OF CENSUS INDUSTRY SECTOR DATA WITH WAGE AND SALARY EARNERS SURVEY DATA, AUGUST 2001.

ANZSIC industry	GOVERNMENT			PRIVATE (a)			TOTAL (b)		
	Census	WSE(c)	Difference	Census	WSE(c)	Difference	Census	WSE(c)	Difference
Agriculture, Forestry and Fishing	6 736	4 100	2 636	(d)—	(d)—	(d)—	6 736	4 100	2 636
Mining	946	np	..	70 268	np	..	72 035	67 700	4 335
Manufacturing	7 214	2 000	5 214	862 857	855 500	7 357	885 842	857 600	28 242
Electricity, Gas and Water supply	31 326	38 900	-7 574	27 231	12 000	15 231	58 900	50 900	8 000
Construction	19 915	20 600	-685	296 562	353 700	-57 138	327 058	374 300	-47 242
Wholesale Trade	2 452	300	2 152	361 675	517 300	-155 625	368 867	517 600	-148 733
Retail Trade	7 634	500	7 134	978 655	1 106 600	-127 945	1 000 573	1 107 100	-106 527
Accom, Cafes and Restaurants	4 583	700	3 883	344 918	388 300	-43 382	355 851	389 000	-33 149
Transport and Storage	40 325	41 700	-1 375	239 592	276 400	-36 808	284 435	318 100	-33 665
Communication Services	73 305	np	..	55 747	np	..	130 143	112 300	17 843
Finance and Insurance	10 937	9 100	1 837	268 177	289 600	-21 423	281 874	298 700	-16 826
Property and Business Services	49 492	33 000	16 492	644 894	1 101 600	-456 706	705 566	1 134 700	-429 134
Govt admin and Defence	289 706	386 200	-96 494	7 402	..	..	309 691	386 200	-76 509
Education	363 887	453 100	-89 213	199 781	195 200	4 581	568 246	648 200	-79 954
Health and Community Services	260 116	316 400	-56 284	461 586	558 700	-97 114	734 678	875 000	-140 322
Cultural and Recreational Services	32 421	33 100	-679	128 217	158 600	-30 383	162 912	191 700	-28 788
Personal and other Services	79 370	99 000	-19 630	149 185	178 500	-29 315	234 195	277 400	-43 205
Non-classifiable units	1 278	..	..	25 554	..	..	34 790	..	34 790
Not stated	4 208	..	..	22 003	..	..	103 604	..	103 604
Total	1 285 851	1 438 700	-232 586	5 144 304	5 992 000	-1 028 670	6 625 996	7 610 700	-984 704

.. not applicable

— nil or rounded to zero (including null cells)

np not available for publication but included in totals where applicable, unless otherwise indicated

(a) For comparison purposes employees in the Agriculture, Forestry and Fishing have been excluded from Private sector as they are out of scope for the Wage and Salary Earners survey.

(b) The total for the census includes a small number of CDEP respondents.

(c) All WSE Survey numbers rounded to nearest hundreds, therefore, the totals in the table may slightly vary from actual totals.

(d) Not in scope of WSE survey.

Source: 6248.0 Wage and Salary Earners, September Quarter 2001. Table 11: Sector - Australia: Original; Private and Public.

5.1 CONCLUSIONS

Industry Sector (GNGP) is one of the key components of industry data in the census, which in conjunction with the Industry of Employment and Labour Force Status can provide a more complete picture of the dynamics of the employment characteristics of the Australian population at the national, State/Territory, small area and small population levels.

The analysis of the 2001 Census data for the Industry Sector shows that:

- The non-response rate to the business name question in the 2001 remained unchanged at 2.4% and in line with non-response rates of several other census questions.
- Between 1996 and 2001, there was 10.7% increase in the number of Private sector employees and 1.1% decline in the number of Government sector employees. The CDEP sector showed the highest intercensal growth (61%).
- The quality of data of the Industry Sector was affected by a number of form design and data processing issues. The quality of the government sector data was affected by deficiencies in the Business name index. The quality of the Private sector data was affected by a data processing procedure which by default 'dumped' any business that could not be coded to other Industry Sectors into the Private sector. As a consequence, many government organisations were incorrectly coded to the Private sector.
- The edit to remove inconsistencies between Labour Force Status and Industry Sector (Employers or Own account workers who were included in the Government Sector) was not always applied.
- The quality of the CDEP data suffered due mainly to issues associated with the enumeration strategies and processing procedures used for collecting and coding data from Indigenous people. An internal review on the collection of the Indigenous industry and occupation data confirmed the quality problems of the census CDEP data. Informal reports indicate that the 2001 Census captured CDEP data from only 60% of the Indigenous CDEP participants, suggesting the need for a thorough review of the use of the census as the appropriate means to collect the CDEP data.

As part of the report, a number of recommendations have been made to improve the quality of the Industry Sector data in the 2006 Census. A summary of the key recommendations is given in the next section.

6.1 RECOMMENDATIONS

- Assign a higher priority to produce a better Business name index:

The index used in the 2001 Census was reported to be not up-to-date and missed out several government organizations (e.g. Schools). Ad-hoc and frequent updates to the index during the 2001 data processing also introduced inconsistencies creating data quality problems. For example, two respondents working in the same public school may have been coded differently if one was processed before the school was included in the index and the other respondent processed after the school's inclusion in the index. While index updates may be inevitable, it is recommended to make greater efforts to update the index in advance to reduce ad-hoc updating.

- Include a separate category for 'inadequately described and other' businesses that could not be coded to government or private sectors:

In the 2001 and previous censuses, respondents whose employer's business name could not be matched to any in the Business name index were 'dumped' into the Private sector. While some of these may be private businesses, others may not be. As a consequence, the Private sector data may be inaccurate. This affects the data quality of not only the Private sector, but also the data quality of other industry sectors. At present it is not possible to separate respondents whose Private sector codes were genuine (i.e. resulted from an exact match) from respondents who were dump coded to Private sector (i.e. resulted from inability to find an exact match). A separate category for the inadequately described or other businesses will help to more accurately reflect the number of Private sector employees. Therefore, in the 2006 Census, it is recommended to introduce a separate category for inadequately described and other responses which could not be coded to either the Government or Private sectors.

- Remove the CDEP category from Industry Sector classification and design a more robust strategy to collect CDEP data from Indigenous people:

It is recommended that for 2006, the CDEP category be removed from the Industry Sector classification, allowing employers of Indigenous people to be correctly coded, and that the information about CDEP be provided by another data field, subject to development of a sound concept supported by robust form design, collection, and processing procedures. This is important data for many census users but it has not been well collected by the census in recent cycles.

- Ensure edits are applied to all the data

Discrepancies appeared in the final data (persons who had a Labour Force Status of Employer or Own account worker were coded to the Government Sector). It is recommended that checks are put in place to ensure that edits are correctly applied to all data

CENSUS PAPERS

2001 Census Papers:

- 03/09 *2001 Census: Level, Main Field and Year of Completion of Highest Non-School Qualification*
- 03/08 *2001 Census: Industry*
- 03/07 *2001 Census: Residential Status in Non Private Dwellings (NPDs); Type of NPD; and Relationships reported on Personal forms*
- 03/06 *2001 Census: Occupation*
- 03/05 *2001 Census: Labour Force Status*
- 03/04 *2001 Census: Income*
- 03/03 *2001 Census: Computer and Internet Use*
- 03/02 *2001 Census: Housing*
- 03/01b *2001 Census: Ancestry - Detailed Paper*
- 03/01a *2001 Census: Ancestry - First and Second Generation Australians*
- 02/03 *2001 Census: Form Design Testing*
- 02/02 *Report on Testing of Disability Questions for Inclusion in the 2001 Census*
- 02/01 *2001 Census: Digital Geography Technical Information Paper*

1996 Census Working Papers:

- 00/4 *1996 Census Data Quality: Income*
- 00/3 *1996 Census Data Quality: Industry*
- 00/2 *1996 Census Data Quality: Qualification Level and Field of Study*
- 00/1 *1996 Census Data Quality: Journey to Work*
- 99/6 *1996 Census Data Quality: Occupation*
- 99/4 *1996 Census: Review of Enumeration of Indigenous Peoples in the 1996 Census*
- 99/3 *1996 Census Data Quality: Housing*
- 99/2 *1996 Census: Labour Force Status*
- 99/1 *1996 Census: Industry Data Comparison*
- 97/1 *1996 Census: Homeless Enumeration Strategy*
- 96/3 *1996 Census of Population and Housing: Digital Geography Technical Information Paper*
- 96/2 *1996 Census Form Design Testing Program*

A range of 1991 Census Working Papers, from 93/1 to 96/1 are also available.

These Papers can be accessed on the ABS web site at <<http://www.abs.gov.au>>. From the ABS home page, select *Census -> (Census Information) Fact Sheets and Census Papers -> (Fact Sheets and Information Papers) Census Papers*.

If you have further data quality queries, please contact the Assistant Director, Census Evaluation by telephone: (02) 6252 5611 or email: <joanne.healey@abs.gov.au>.

GLOSSARY

Australian and New Zealand Standard Industry Classification (ANZSIC)	A classification, first issued in 1993, developed for use in Australia and New Zealand for the production and analysis of industry statistics.
Community Development Employment Project (CDEP)	<p>A scheme developed in 1976 to provide local employment opportunities to remote Aboriginal communities with a particular focus on community development. In 1985 CDEP was expanded to include Aboriginal and Torres Strait Islander communities living in rural and urban areas.</p> <p>CDEP is funded and supported by the (now abolished) Aboriginal and Torres Strait Islander Commission (ATSIC). ATSIC allocated grants to participating community organisations who employed members of the local community. CDEP participants are considered as employees in the census and included as a separate category in the Industry Sector classification.</p>
Data Capture (DC)	Data capture is the process of scanning the forms into the image and text files that are used for all subsequent processes. At this stage, mark-box responses are captured and text responses are examined for their fitness for automatic coding (AC).
Data Processing Centre	The Data Processing Centre (DPC) is the central site where the capture, data entry and coding of all census forms takes place.
Government sector	Businesses or organisations completely or majority owned by the Commonwealth, State/Territory, or Local government. The sector also includes the different departments belonging to the three levels of government.
Household	A household is defined as a group of two or more related or unrelated people who usually reside in the same dwelling, who regard themselves as a household, and who make common provision for food or other essentials for living; or a person living in a dwelling who makes provision for his/her own food and other essentials for living, without combining with any other person.
Household form, and Guide	The Household form is the primary means for collecting census data and is used in all private dwellings. An information Guide was given out to every household along with each Household form to assist respondents answer census questions.
Industry Sector	This variable classifies employed people aged 15 years and over according to whether they are employed in the government or non-government (private) sector. Industry Sector has separate categories for Commonwealth, State/Territory and Local Government, Community Development Employment Program, and the Private sector.
Inteframe	A business register containing basic industry specific identification details of all registered Australian businesses including ANZSIC levels
Personal form	<p>The Personal form records details for one person only. It contains the same questions as the Household form, with the exception of household dwelling questions.</p> <p>The Personal form is used:</p> <ul style="list-style-type: none"> ■ For households with more than six people ■ For privacy, if any person in a household prefers ■ In Non-Private Dwellings: one Personal Form is completed for each person in a Non-Private Dwelling on Census Night.

Personal form <i>continued</i>	A Personal Guide was given out with every Personal form for people in Non-Private Dwellings, and to those opting to fill a Personal Form in Private Dwellings or Other Dwellings.
Overseas Visitors	In the 2001 Census, overseas visitors were those people who were visiting Australia and indicated they would be in Australia for less than one year. Overseas Visitors are separately categorised for most census characteristics except for age, sex and marital status in standard tabulations.
Private Dwelling	A private dwelling (PD) is normally a house, flat, or even a room. It can also be a caravan, houseboat, tent, or a house attached to an office, or rooms above a shop. A private dwelling may be occupied by one or more people, or unoccupied.
Private sector	Businesses or organisations completely or majority owned by private individuals or companies, incorporated or otherwise.
Special Indigenous Form	The form used for collecting data from Indigenous Australians living in remote, rural, and discrete communities. The Special Indigenous form includes questions to capture the special dwelling and social characteristics of the Indigenous people living in these communities. Data was collected from these people through personal interviews by trained collectors.

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