

APPENDIX 2. TECHNICAL APPENDIX

Response rate

The overall response rate was 53%. In total, 9,916 people were selected for the survey and 5,235 responded. The departmental response rates varied from 16% to 93%, although 33 of the 35 departments had response rates over 40%.

Sample Design

Survey scope

The target population for the Career Progression and Development Survey was defined as “current employees in the Public Service as at 30 June 2004, who have an employment contract of service with the chief executive of the department, and to whom the usual conditions relating to being an employee apply, and Public Service chief executives”.

The following people were excluded:

- fixed-term employees
- casual employees
- contractors and consultants where payment was made to a company rather than to the worker.

Frame

The sampling frame used for the Career Progression and Development Survey was department-based. The frame was constructed from the SSC Human Resource Capability (HRC) dataset, which contains anonymised unit record information for every person employed in the Public Service, including chief executives, as at 30 June each year. This unit record information is collected from the human resource units of each Public Service department. Due to the nine-month delay between the HRC data for 30 June 2004 and the survey field phase (March/April 2005), some selected staff were no longer employed by a department. To maintain the departmental sample size, these staff were replaced by a second random sample.

Stratification

The design was a stratified random sample with two levels of stratification:

- Level 1 “Super-strata” – division of staff members into their respective departments
- Level 2 “Sub-strata” – further division of each department into strata based on gender and ethnicity.

Allocation across strata, sample selection, and weighting

The sample size in each super-strata depended on two factors:

- whether the department required a report containing their own results
- the number of staff employed in the department.

For those departments requiring their own report, the available sample was allocated towards smaller departments and away from larger departments. In departments with fewer than 400 employees, everyone was selected; in departments with 400 or more employees, a sample was selected from within each of the sub-strata. The allocation of the sample across the sub-strata was also targeted towards Māori, to provide better estimates for this sub-population.

Fourteen departments did not require departmental reports. For these departments there was no requirement for accurate estimates at the departmental level. The 14 departments were therefore combined into one super-stratum and a stratified sample was selected from each of the sub-strata. The allocation to sub-strata targeted Māori and also ensured the sample was evenly spread across both male and female staff members.

The survey was weighted to reflect the sample design, and to account for the uneven probabilities of selection. An adjustment factor to account for non-response was applied within each department.

Survey procedures

The survey consisted of a single questionnaire, administered in electronic (web-based) or paper-based form. Most questionnaires were completed electronically.

Feedback from the field phase of the survey indicated that most respondents found the questionnaire easy to complete. The problems identified in the field stage centred around the electronic method – difficulties associated with usernames and passwords in accessing the web questionnaires.

Sampling Error Calculations

We have used the results from this sample to draw conclusions about the entire Public Service and specific sub-populations within the Public Service. However, because only a proportion of the Public Service was selected for the survey, the estimates are subject to sampling error.

A module of SPSS (a statistical analysis tool), called Complex Samples, was used to correctly account for the sample design in the sampling error and confidence interval calculations.

Sampling errors for point estimates

The sample errors have been used to estimate the accuracy of the point estimates. A survey estimate with a large sampling error is unreliable; therefore, the sampling error – a statistical measure that can be calculated for each estimate – should be used to examine the reliability of each estimate. The formula for the Public Service sampling errors of point estimates (proportion) is:

$$\text{sampling error}(\hat{p}) = 1.96 \sqrt{\frac{1}{N^2} \sum_{h=1}^l N_h^2 \left(\frac{1-n_h}{N_h} \right) \frac{\hat{p}_h(1-\hat{p}_h)}{n_h}}$$

where:

n_h = the number of respondents in stratum h

\hat{p}_h = the estimate of the proportion in stratum h

N_h = the total number of Public Servants in stratum h

N = the total number of Public Servants.

Confidence intervals for point estimates

The sampling error is used to construct a confidence interval around the point estimate (proportion). This report uses a 95% confidence interval for estimates, which means that the confidence interval has a 95% chance of containing the population value. From the sampling error formula above, the confidence interval for each proportion is:

$$95\% \text{ CI} = \hat{p} \pm \text{sampling error}(\hat{p})$$

Confidence intervals are provided in the tables in Appendix 1, in brackets beneath the relevant proportion.

Confidence intervals for the difference between two point estimates

Estimates of the difference between sub-groups from the 2005 survey, and changes between the 2000 and 2005 survey have been calculated using the following formula:

$$\text{diff} = \hat{p}_1 - \hat{p}_2$$

A 95% confidence interval for the difference between two point estimates can also be calculated. The formula used by the SPSS Complex Samples module is:

$$95\% \text{ CI} = \text{diff} \pm 1.96 \sqrt{\text{var}(\hat{p}_1) + \text{var}(\hat{p}_2) - 2\text{covar}(\hat{p}_1, \hat{p}_2)}$$

A confidence interval that includes 0 means that no statistically significant difference has been found between the two proportions. This method has been used to compare the results of different groups – for example, comparing the results from females with those from males, or comparing the results from the 2000 survey with the 2005 survey.