
Planning and Preparation for Sample Enumeration

CHAPTER 2

PLANNING AND PREPARATION FOR SAMPLE ENUMERATION

Census 2020 adopted the register-based approach, similar to Census 2010. In addition to information obtained from merged administrative records in the national databases, more in-depth information was collected through a sample survey of close to 150,000 households in Singapore. This represented about 10 per cent of the 1.4 million households in Singapore in 2020. To ensure the smooth running of the Census, careful planning and preparations were made prior to the actual conduct of the Census. Preparations included reviewing the sampling methodology, seeking users' inputs and finalising the list of Census data items, updating the national standard classifications, refining the workflow to manage the expected case load and conducting a pilot survey before the start of the main Census operations.

2.1 SAMPLE DESIGN AND SELECTION

This section outlines the Census 2020 sample design and selection. A separate detailed write-up on the sampling variability and errors is included in Appendix R.

The sample for the Census 2020 was selected from a sampling frame comprising all residential dwelling units in Singapore. As the sample survey of the Census 2020 covered only households in residential dwellings, institutions such as nursing homes, hostels and hotels were excluded from the frame.

The sample was selected based on a stratified design. Dwelling units in the sampling frame were divided into different groups. The groups are defined based on the planning areas demarcated by the Urban Redevelopment Authority and broad dwelling type groups. A random sample was then selected from the different groups by systematic sampling with a random start. The samples selected from each group were combined to form the sample of about 150,000 dwelling units.

2.2 CONDUCT OF THE LABOUR FORCE SURVEY AS A SUB-SAMPLE OF CENSUS 2020

As with the approach adopted in Census 2010 where Ministry of Manpower (MOM)'s Comprehensive Labour Force Survey (CLFS) was carried out as a sub-sample of the Census 2010, the Census 2020 also leveraged the 2020 CLFS. The approach ensured that there was no overlap in households selected for the two major surveys and allowed for a continuous and consistent series of annual labour statistics from the

CLFS. As a result, respondents selected only needed to respond once to either the main Census sample or the CLFS sub-sample. In 2020, the CLFS sub-sample constituted about one-fifth of the overall sample and covered detailed labour-force related items besides questions asked in the main Census.

Since the 2020 CLFS would be conducted concurrently with the Census 2020, there was a need for a common understanding and treatment to be applied for all data items collected. The Census-CLFS Workgroup was set up to ensure meaningful consolidated results at the end of the two surveys. Discussions were held between the two teams on details pertaining to data items to be collected, phrasing of the questions and the standardisation of concepts and definitions. Operational matters such as publicity, tokens of appreciation and matters involving communications to the public, were also under the purview of this Workgroup.

Arising from the COVID-19 situation and disruptions during the survey period, the Workgroup worked closely together to ensure common understanding and consistent treatment of new scenarios.

2.3 DATA ITEMS COLLECTED IN THE CENSUS 2020

As part of the planning for Census 2020, DOS undertook an extensive user consultation on the data requirements for the Census involving all ministries and their statutory boards from August 2017 to May 2018. This consultation process helped in planning for a census responsive to users' needs for relevant and meaningful statistics.

2.3.1 Selection Criteria

Multiple factors were taken into account when selecting the data items to be included in the Census enumeration. The final data items selected had an impact on the format of the questionnaire, accuracy and quality of respondents' survey returns, resources needed for data processing and schedule for the Census releases.

Each data requirement was evaluated carefully based on the principles of national priority, suitability of topics for collection via a large-scale census, the need for data at small area level and availability of alternative or close complementary data. These guiding principles were in accordance with the UN Principles and Recommendations for Population and Housing Censuses.

Table 2.3.1: Selection Criteria

No.	Guiding Principle	Consideration
1	National priority	The census topics should have wide relevance and meet the needs of a broad range of data users, including users in the government, private sector as well as members of the public.
2	Suitability of topics for collection via a large-scale census	Topics should be those that respondents are able to provide accurate information on. Sensitive questions which require detailed probing or explanations should be avoided as self-enumeration without assistance from interviewers and proxy reporting where one member reports for the whole household are commonly practised.
3	Need for data at small area level	The need to have small area statistics should be considered ahead of information needed for the general population, which may be available from other sources including smaller sample surveys.
4	Availability of alternative or close complementary data	In evaluating the requirements, alternative sources of close complementary data should be considered if available. These include alternative administrative data or customised surveys.

2.3.2 Data Items

DOS received a total of 108 data requirements from government agencies for Census 2020 and assessed the need for 135 unique data items including those from past Censuses. Detailed discussions were held with various agencies on the proposed data items for inclusion in the Census 2020 to ensure timeliness, relevance, practicability and quality of the Census. Through this iterative process and after much deliberation, a final list of data items was streamlined to 64 and endorsed by the ministries in May 2018. The endorsed list was grouped into the following broad categories:

- a) Demographic and social characteristics
- b) Household and housing characteristics
- c) Economic and educational characteristics
- d) Transport
- e) Difficulty in performing basic activities

Of the 64 items, 13 items were obtained directly from the Household Registration Database (HRD) and administrative databases maintained by DOS. The remaining items not available from the HRD were collected from the large-scale sample survey. Compared with the 2010 Census, 8 new data items were collected in Census 2020. These related to information on difficulty in performing basic activities,

workplace location and second most frequently spoken language at home. The full list of data items is given below:

Table 2.3.2: List of Data Items[@]

Demographic & Social Characteristics	
1	Name [^]
2	Singapore National Registration Identity Card (NRIC)/ Foreign Identification Number (FIN) [^]
3	Sex [^]
4	Identification Type [^]
5	Ethnic Group/Dialect Group [^]
6	Date of Birth/Age [^]
7	Marital Status
8	Religion
9	Languages Literate In
10	Language/Dialect Most Frequently Spoken at Home
11	Language/Dialect Second Most Frequently Spoken at Home <i>[New Item]</i>
International Migration Characteristics	
12	Country of Birth [^]
13	Citizenship [^]
14	If residing outside Singapore, - Country Currently In - Reason for Living Abroad
Household Characteristics	
15	Relationship to Household Reference Person <i>(refers to "head of household" in previous censuses)</i>
16	Parent-Child Linkage
17	Spouse Linkage
Housing	
18	Type of Present Dwelling [^]
19	Tenancy of Present Dwelling
Fertility	
20	Number of Children Born Alive (for all females)

Table 2.3.2: List of Data Items[@] (Cont'd)

Educational Characteristics		
21	Level of Education Attending	
22	Highest Academic Grade/Qualification Attained	
23	Major Field of Study (for polytechnic/university graduates)	
24	Country Where Highest Qualification Was Attained (for polytechnic/university graduates)	
25	Whether Acquired Vocational Qualification [^]	
26	Type of Vocational Qualification Acquired [^]	
27	Field of Study of Vocational Qualification [^]	
28	Educational Institution Where Vocational Qualification was Obtained [^]	
Employment Characteristics		
29	Current Economic Activity Status	
30	Employment Status	
31	Name of Employer/Firm	
32	Main Business/Activity or Main Products/Services	
33	Occupation/Job Title	
34	Main Tasks and Duties	
35	Workplace Location	<i>[New Item]</i>
36	Nature of Employment	
37	Usual Number of Hours Worked Per Week	
38	Income from Work, Excluding Bonus	
39	Bonus Received in Last 12 Months	
Job Mobility & Underemployment		
40	Duration of Present Job*	
41	Previous Occupation – Job Title*	
42	Previous Occupation – Main Tasks and Duties*	
43	Previous Industry – Main Business Activity or Main Products/Services*	
44	Willingness to Work for Additional Hours*	
45	Availability for Additional Work*	
Economic Characteristics of Non-Working Persons		
46	Whether Available to Start Work in the Next 2 Weeks	
47	Whether Any Action to Look for Work in the Last 4 Weeks	
48	Action Taken to Look for Work	
49	Main Reason for Not Working	
50	Whether Worked Before*	
51	Duration of Unemployment*	
52	When Left Last Job*	
53	Main Reason for Leaving Last Job*	

Table 2.3.2: List of Data Items[@] (Cont'd)

Income from Non-work Sources	
54	Rental Income*
55	Investment Income*
56	Income from Other Sources*
Transport	
57	Usual Mode of Transport to Work/School
58	Usual Travelling Time to Work/School
Difficulty in Performing Basic Activities[#]	
	<i>[New Topic: 6 New Items]</i>
59	Difficulty seeing, even if wearing glasses
60	Difficulty hearing, even if using a hearing aid
61	Difficulty with body movement activities such as: (a) walking or climbing steps; or (b) transferring from bed to chair/wheelchair (and vice versa)
62	Difficulty remembering or concentrating
63	Difficulty with self-care activities such as: (a) washing all over (bath/shower) or dressing; (b) feeding; or (c) using the toilet
64	Difficulty communicating, for example understanding or being understood using usual (customary) language

[@] A copy of the Census 2020 survey form is available in Appendix I.

[^] Items obtained from administrative sources.

^{*} Items covered in the CLFS sub-sample only.

[#] Broadly based on Washington Group's Questions on Disability, with slight modifications to incorporate agencies' requirements.

2.4 UPDATES TO SINGAPORE STANDARD STATISTICAL CLASSIFICATIONS

The adoption of a common framework for classifying statistical information in the collection, analysis and dissemination of statistics ensures consistency and comparability of data. This in turn facilitates data sharing and analysis among data producers and users.

In the run-up to the Census 2020, the national standard statistical classifications for occupation, industry and education were reviewed and updated.

A working group, comprising representatives from key ministries and agencies which produce and/or use the data, was formed to facilitate the review of each classification. Inputs were also obtained from the relevant government ministries and statutory boards who were key users of the data. Revisions to the classifications were aligned to international classifications with appropriate modifications to take into account Singapore's context.

2.4.1 Occupational Classification

The Singapore Standard Occupational Classification (SSOC) 2020 adopts the basic framework of the International Standard Classification of Occupations 2008 (ISCO-08).

The SSOC is a classification of occupations according to the type of work performed. Its primary objective is to classify the occupations of the civilian working population, but with provisions for the collective classification of those in the armed services and the foreign diplomatic personnel. It is not applicable to the economically inactive population such as housewives, full-time students, retired persons and social volunteers.

The basic principle used in the classification of occupations in the SSOC 2020 is the main type of work performed. Persons who perform the same principal tasks are considered as doing the same type of work and classified under the same occupational group irrespective of work experience, skills and qualifications. Besides formal educational qualifications, skill levels can take the form of professional certification, informal training and experience.

The SSOC 2020 comprises five levels of aggregation, namely Major Group, Sub-major Group, Minor Group, Unit Group and Occupation. A numerical five-digit coding system is used to distinguish the different levels of classification. The numbering system is hierarchical in nature, showing progressively finer details in skill specialisation from the highest level of aggregation (1-digit) to the lowest level (5-digit). This allows users the flexibility to tabulate, analyse and publish data according to the level of detail required.

For the Census 2020, occupations were captured and coded to the 5-digit level of the SSOC 2020, which was one level more detailed than the 2010 occupational data.

2.4.2 Industrial Classification

The Singapore Standard Industrial Classification (SSIC) 2020 adopts the basic framework of the International Standard Industrial Classification Revision 4 (ISIC Rev. 4). The classification incorporates recent changes in economic activities to better reflect the current structure of Singapore's economy.

The SSIC is a classification of economic activities undertaken by economic units. It does not draw distinction according to the type of ownership, type of legal organisation or mode of operation. Economic units which engage in the same or similar kind of economic activity are classified under the same SSIC category, irrespective of whether they are corporate entities or government units, or operate in the formal or informal sector.

Like the SSOC, the SSIC 2020 is a classification with a hierarchical structure and uses a numerical five-digit coding system to distinguish the different levels of classification. Similarly, data on industries in the Census 2020 were captured and coded to the 5-digit level of the SSIC 2020, one level more detailed than the 2010 industry data.

2.4.3 Educational Classification

The Singapore Standard Educational Classification (SSEC) 2020 makes reference to and is consistent with the basic framework and principles of the International Standard Classification of Education (ISCED) 2011 and the ISCED Fields of Education and Training (ISCED-F) 2013 developed by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) Institute for Statistics (UIS). It consists of three components:

- Classification of Level of Education Attending
- Classification of Educational Qualification Attained
- Classification of Field of Study

The hierarchical structure of the SSEC is defined by aggregation levels and groups which use Singapore's present education system and the formal educational qualifications currently awarded in Singapore as the basis. For educational programmes offered in Singapore based on foreign education systems, and qualifications which were awarded in Singapore in the past or those awarded overseas, the approximate equivalence to the current system and qualifications in Singapore are used to facilitate the appropriate classification.

The SSEC 2020 has been revised to maintain relevance by taking into account changes in Singapore's education landscape, as well as changes in international standards to allow for international comparability. In addition to changes in the education and certification systems, developments in the Continuing Education and Training (CET) programmes and qualification/certification systems to upgrade the workforce under the Skills Framework have also been taken into consideration when revising the SSEC 2020.

2.5 PILOT SURVEY

2.5.1 Objectives and Key Features

Pilot surveys are conducted prior to major surveys to help identify and rectify potential operational issues before the actual survey. As the data collection modes adopted for the Census 2020 were largely similar to earlier surveys, a pilot survey for the Census was conducted with officers from DOS who were not directly involved in the Census to minimise the resource requirements and potential response burden for the public.

Officers were notified via email and provided information about the pilot survey, submission mode and assigned House ID. The pilot survey was conducted from 16 to 26 December 2019.

The main objectives of the pilot survey were as follows:

- a) To test the workflow for Internet submission and CATI in operation and fine-tune the work and system processes for the actual survey;
- b) To test the robustness of the system to handle volume and implementation of Internet submission, inbound and outbound calls at the Census 2020 Call Centre as an integrated system;
- c) To evaluate question wording and flow, particularly new items/revised phrasing, as part of pre-testing and identify areas for improvements; and
- d) To fine-tune operational procedures and enhance training, logistics support and progress management.

2.5.2 Refinements Following the Pilot Survey

Feedback from the pilot survey was obtained from both DOS officers and Census officers for evaluation. From these feedback, areas for improvements were identified, workflow and system processes were fine-tuned.

Some of the key refinements included the following:

- a) Improved the system performance of the Internet submission system to reduce the loading time for enumeration screens;
- b) Improved the onscreen display, i.e. placement of questions, questionnaire phrasing and options for selecting responses;
- c) Refined call services and quality for calls made/received at the call centre; and
- d) Updated training materials with more specific examples and improvement to survey processes.

The improvements to the system and the workflow were carried out with respondents' convenience in mind as well as to improve efficiency and effectiveness on the conduct of Census 2020. These refinements were tested again on a smaller group and implemented before the actual launch of the Census.

2.6 SURVEY OF LARGE HOUSEHOLDS (SLHH)

2.6.1 Fieldwork for Large Households

In Census 2010, the Survey of Large Households (SLHH) was conducted prior to the main Census 2010 to improve the efficiency during the fieldwork operations. The SLHH covered households that were large in size and potentially more difficult to enumerate.

For the conduct of the SLHH which started from 7 February 2020, dwelling units in the Census 2020 sample containing 12 or more persons were allocated to fieldwork senior supervisors and supervisors to enumerate using tablets prior to the start of the main fieldwork operations. As some field supervisors were newly appointed, the SLHH also allowed them to gain first-hand experience of the field planning and data collection processes.

In light of the COVID-19 outbreak in early 2020, Singapore raised its Disease Outbreak Response System Condition (DORSCON) level from Yellow to Orange on 7 February 2020. Additional precautionary measures were swiftly put in place to ensure the well-being of everyone.

Some of the essential adjustments included the suspension of field visits with the surveys completed with respondents over the phone unless there had been prior arrangements for fieldwork appointment, and sending reminder letters to respondents to encourage them to respond via Internet or Census 2020 Hotline as far as possible.