

For information

Legislative Council Panel on Financial Affairs

**Computer Equipment and Services
for the 2011 Population Census**

PURPOSE

This paper briefs Members on the Administration's proposal to create a new commitment of \$85.273 million for acquiring the computer equipment and services required for the 2011 Population Census (11C) to be conducted by the Census and Statistics Department (C&SD).

BACKGROUND

2. Population censuses were conducted in Hong Kong in ten-year intervals in 1961, 1971, 1981, 1991 and 2001 and population by-censuses were conducted in the middle of the intercensal period in 1966, 1976, 1986, 1996 and 2006. The next population census will be conducted in 2011.

3. The aim of conducting population censuses/by-censuses is to obtain up-to-date benchmark information on the socio-economic characteristics of the population and on its geographical distribution. They provide benchmark data for studying the direction and trend of population changes. The data are key inputs for making projections concerning population, household, labour force and employment. Population censuses/by-censuses differ from other general household sample surveys in their sizable scale, which makes it feasible to provide statistics of high precision even for population sub-groups and small geographical areas. Such information is vital to the Government for planning and policy formulation and important to the private sector and academia for business and research purposes.

4. C&SD has conducted an extensive consultation exercise to seek views on various aspects of the planning work for the 11C from May 2008 to January 2009. At the meeting of the Legislative Council (LegCo) Panel on Financial Affairs on 5 January 2009, to which all LegCo Members were invited to attend, we briefed Members on the planning work for the 11C, including the proposed development of computer systems to support its operation.

JUSTIFICATION

Computer Support for the 11C

5. In conducting the 11C, C&SD will adopt a Long Form questionnaire on detailed characteristics for a sample of one-tenth of the entire population and a Short Form questionnaire on basic characteristics for the remaining of the population. It is a large-scale and complex operation involving the recruitment and training of some 20 000 temporary field workers; the enumeration of more than 2.4 million households during the 45-day data collection period from 19 June to 2 August 2011; the processing of the completed questionnaires within around half a year; and the dissemination of the 11C results in the form of statistical reports from February 2012 to March 2013.

6. Different from previous population censuses in which data were collected basically by face-to-face interviews, a new multi-modal data collection approach will be introduced in 11C. Under the new approach, C&SD will make available new and additional means for data collection from the households in the 11C through delivery of questionnaires by post and via the Internet for self-enumeration in the first stage of the data collection period (19 June to 15 July 2011) and the interviewer method will be activated for enumerating the remaining households in the latter stage of the data collection period (16 July to 2 August 2011). An integrated computer system is therefore needed to consolidate the returns collected from different modes to tie-in, among other enhancements, with the new multi-modal data collection approach.

7. To facilitate the planning and conduct of the 11C, a feasibility study was conducted to examine the technical requirements, financial and resources implications of the required system. An in-house Business Process Re-engineering (BPR) study was also conducted to explore opportunities to streamline the whole process and identify improvement opportunities of the 11C.

The Proposed Computer System for 11C

8. The feasibility cum BPR study, completed in February 2009, proposes to re-use the computer systems developed for the 2006 Population By-census (06BC) to the extent possible, and at the same time recognises that redevelopment/upgrading of the 06BC systems would be required to meet the changing requirements of the 11C (such as the adoption of the new multi-modal data collection approach and the need to survey the entire population in the 11C) and to provide increased functionalities to ensure smooth operation of the 11C (in terms of better data quality control, more effective handling of public enquiries and field work management as well as integration among various sub-systems). The feasibility cum BPR study therefore recommends that a new 11C computer system

should be established using a combination approach involving enhancement of two sub-systems of the 06BC, re-development of its another 14 sub-systems, and development of two new sub-systems. This combination approach ensures that the most cost-effective solution is adopted.

New Functions of the 11C Computer System

9. To provide better services to the public and to improve the efficiency of the 11C operation, the following new functions/features will be added to the proposed computer system –

(a) ***Improving data accuracy***

In order to improve data accuracy, data obtained from various channels will be checked and validated on a daily basis¹ so that erroneous entries can be clarified and rectified with the respondents within the census period as far as possible.

(b) ***Improving efficiency of recruitment and training processes***

C&SD will establish an on-line e-Recruitment module on the Internet to replace the traditional paper applications. The on-line system can be used to accept applications, release appointment results and arrange training schedules for successful applicants through electronic channel so as to streamline the recruitment and training processes and achieve greater cost-effectiveness in the process.

(c) ***Improving field operational efficiency***

Intelligent Character Recognition (ICR) technology will be extended to capture enumeration progress for better fieldwork monitoring. This will help avoid transcription errors and repeated checking of the progress updates, and hence shorten the processing time. With more extensive use of information and communication technology in fieldwork management, the field operation can be managed more efficiently and the enumeration progress can be monitored more closely through the availability of more timely progress updates.

(d) ***Launching the e-Reporting mechanism***

C&SD will implement on-line e-Reporting in 11C which is

¹ In the past, data validation was done after the census period.

applicable to all households in the first stage of the data collection period (19 June to 15 July 2011). Respondents can make use of the on-line system to access and complete the e-questionnaires. We expect that the take-up rates will be about 10% and 5% for Short Form and Long Form questionnaires respectively.

(e) ***Improving incident handling and reporting***

To better manage and improve the responsiveness in incident handling, C&SD will set up workflow functions and establish a repository comprising Q&As and guidelines to enhance reporting efficiency and support more effective incident handling.

(f) ***Enhancing the quality assurance mechanism***

Apart from quality checks on selected cases as in previous censuses, C&SD will further enhance the quality assurance mechanism for more efficient and effective selection of dubious cases, review of “non-contact” cases and analysis of checking results in order to facilitate timely follow-up and effectively reduce the number of such “non-contact” cases.

(g) ***Strengthening the questionnaire tracking mechanism***

Under the multi-modal data collection approach, C&SD will establish a central system to enable accurate and rapid tracking of completed questionnaires across different operations. This will help track the status of returned questionnaires and maintain a systematic flow of information from one system to another to avoid any loss of questionnaires during transit.

Cost and Benefit Analysis

10. Given the large scale and complex operation of the 11C, it is impossible to conduct the census without efficient computer support. While it is the experience of statistical offices around the world that an efficient computer system is essential for such a large statistical operation, it is however not possible to quantify precisely the productivity gains and savings arising directly from the computer system. The proposed system will support the smooth conduct of the 11C and the availability of good quality statistics for use by a large number of users in both the public and private sectors.

11. The proposed 11C computer system is designed to meet all the operational, timing and data quality requirements of the 11C project that are essential for its successful implementation. It is designed using a combination approach as

explained in paragraph 8 to ensure maximum cost-effectiveness. In addition, the proposed computer system will achieve notional savings of \$6.407 million in terms of one-off administration cost savings and cost avoidance for additional posts. Besides, with the implementation of the new multi-modal data collection approach which would be made possible only by the proposed 11C computer system, the number of temporary field workers employed will be trimmed by some 3 000 in 11C when compared with 01C, even though the number of households to be enumerated would be increased from 2.0 million in 01C to around 2.4 million in 11C.

Future Use of the 11C Computer System

12. To maximise the return of investment in the 11C computer system, the various components of the proposed computer system will be retained for use after the 11C operation. All the sub-systems for 11C would likely be re-used to support the 2016 Population By-census (16BC) in case there were no fundamental changes in business requirements and the performance of the 11C system could satisfactorily meet the future prevailing operational requirements. Nevertheless, some system enhancements and equipment upgrade are expected to be necessary to tie in with the likely changing technological environment and service needs.

13. Besides, we will re-deploy six of the 18 sub-systems of the 11C to meet other on-going operational needs in the C&SD with a view to maximising the utilisation of the resources.

FINANCIAL IMPLICATIONS

Non-recurrent cost

14. We estimate that implementation of the proposal will incur a non-recurrent cost of \$85.273 million over a five-year period from 2009-10 to 2013-14 for the acquisition of computer hardware, software and related services. Detailed breakdown is as follows –

| | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | Total |
|--------------|----------------|----------------|----------------|----------------|----------------|---------------|
| | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 |
| (a) Hardware | 5,697 | 5,906 | 743 | 743 | 743 | 13,832 |
| (b) Software | 804 | 7,705 | 865 | 865 | 865 | 11,104 |

| | | | | | | | |
|-----|-------------------------|---------------|---------------|---------------|--------------|--------------|---------------|
| (c) | Site preparation | 2,500 | 500 | - | - | - | 3,000 |
| (d) | Implementation services | 500 | 7,057 | 14,759 | 500 | - | 22,816 |
| (e) | Contract staff | 3,195 | 9,655 | 10,768 | 1,307 | 495 | 25,420 |
| (f) | Miscellaneous | 341 | 820 | 2,089 | 160 | 112 | 3,522 |
| (g) | Contingency | 913 | 2,215 | 2,046 | 250 | 155 | 5,579 |
| | Total | 13,950 | 33,858 | 31,270 | 3,825 | 2,370 | 85,273 |

15. As regards items 14(a) and 14(b), the costs are for the acquisition of computer hardware and software. The hardware will include 20 computer servers, about 700 personal computer workstations, peripherals, network equipment and data communication facilities. The software will include operating systems, database management systems, application development tools, e-Reporting software and incident handling software, etc.

16. As regards item 14(c), the site preparation cost is for the setting up of a server room and network connection in the 11C Office, the Central Processing Area and the Packing Site to facilitate the fieldwork operation, data processing work and communication of the 11C.

17. As regards item 14(d), the cost is for hiring of services for equipment installation, system configuration, system development and customisation, the data capturing services of the completed questionnaires and server hosting services.

18. As regards item 14(e), the cost is for hiring of contract staff services for the system implementation work.

19. As regards item 14(f), the cost is for rental of data communication link, acquisition of consumables and staff training.

20. As regards item 14(g), the cost represents a 7% contingency on selected cost items set out in paragraph 14(a) to (f).

Other Non-recurrent Cost

21. The implementation of the project will also entail the non-recurrent staff cost of \$5.066 million for the creation of three time-limited civil service Analyst/Programmer (AP) posts from April 2010 to August 2012. These civil service AP officers will provide stable and experienced workforce to support

project planning and monitoring, system design, procurement and implementation, as well as liaison with users, other government departments and vendors.

22. The required funds will be absorbed through internal re-deployment of resources in C&SD. The breakdown is as follows –

| | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | Total |
|------------|----------------|----------------|----------------|----------------|----------------|---------------|
| | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 |
| Staff Cost | - | 2,096 | 2,096 | 874 | - | 5,066 |

Recurrent cost

23. The cost required for maintaining the computer equipment during the project period has been included in the non-recurrent cost of the project. The recurrent maintenance cost beyond the project period will be absorbed by C&SD.

IMPLEMENTATION PLAN

24. Subject to approval of funding, we plan to adopt the following implementation schedule -

| <u>Major Activities</u> | <u>Target Completion Date</u> |
|--|--|
| (a) Tendering and Procurement | March 2010 |
| (b) System Design and Implementation | March 2011 |
| (c) Trial Run and Fine-tuning | December 2010 |
| (d) User Acceptance Test | May 2011 |
| (e) Census Field Operation | August 2011 |
| (f) Live Run, Production Support and Data Dissemination | March 2013 |
| (g) Post Implementation Monitoring and Support | October 2013 |

WAY FORWARD

25. We plan to submit the proposal to the Finance Committee for approval on 8 May 2009.

Financial Services and the Treasury Bureau
April 2009