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Register-based 2002 Census of Population, Households and Housing in Slovenia: organization and data processing in the view of outsourcing<sup>1</sup>

Submitted by the Statistical Office of the Republic of Slovenia

I. INTRODUCTION

1. The 2002 Census of Population, Households and Housing in Slovenia (the 2002 Census) was the first census carried out totally independently by the Statistical Office of the Republic of Slovenia (the Statistical Office). The preceding censuses took place within the scope of former Yugoslavia. The methodology was prepared by the Federal Statistical Office, with statistical offices in individual republics applying unified methodology with the possibility of adding some (actually very few) questions themselves. The responsibility for the organization of field enumeration and data processing was always the duty of statistical offices in individual republics.

2. Despite the long tradition and experience gained in conducting previous censuses, the Statistical Office faced several novelties, changes and limitations while preparing the 2002 Census. Very briefly some of them should be mentioned.

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<sup>1</sup> This paper has been prepared at the invitation of the secretariat.

- (a) Since independence, Slovenia has joined several international organizations. The most important was accession to the European Union (Slovenia has been a Member State since 1 May 2004). In addition, Slovenian statistics began rapidly to harmonize methodology in different fields with international standards and recommendations. The definition of population according to the Recommendations for the 2000 Censuses of Population and Housing in the ECE Region was for the first time (and this is the most significant difference from previous censuses) fully applied in the 2002 Census in Slovenia.
- (b) There were significant changes in the administrative-territorial structure of Slovenia which influenced the organization of enumeration.
- (c) The organization of the Statistical Office does not include a special department dealing only with censuses. The 2002 Census was an additional workload for the Demographic and Social Statistics Department, but only 6 employees were fully engaged in this project.
- (d) Limitations of the state budget were the reason that the census had to be postponed from 2001 (following previous 10-year periods between censuses) to 2002.
- (e) Rational use of available financial sources was one of the basic starting-points in planning all census activities, so the following issues had to be taken into account: additional employment for the 2002 Census purposes was not possible; employees of the Statistical Office who decided to take part in some phases of the 2002 Census operation had, at the same time, to continue to perform all their regular activities; Slovenian statistics had to be register oriented, with the maximum number of contents provided from the existing statistical and administrative registers. In this context, some data were not collected by fieldwork at all, which reduced the costs; introducing new procedures and simplifications which will demand fewer employees should cut the costs of data processing.
- (f) Changes in the political system and general social conditions made people more conscious of their basic human rights and freedoms, which also reflected in people being more aware of privacy and confidentiality issues. From this point of view, for the first time the Constitutional Court made an intervention into the Census Act by preventing the use of the collected census data for administrative purposes.

## II. CENSUS OUTSOURCING IN THE WORLD

3. We could not rely on other countries' experiences when organizing the 2002 Census (period 2000/2001), making decisions on hiring private contractors and outsourcing other duties, because, in many other countries, the census was still considered to be an internal job for NSO's. The report on Outsourcing the 2001 Census<sup>2</sup> in England and Wales shows that a number of services (including data capture and coding) were outsourced and that they sought to achieve value for money. In total, the outsourced services accounted for one third of the Census budget. Outsourcing will play an important role in conducting the 2006 Census in Canada<sup>3</sup>, starting on 16 May. The value of the work that Statistics Canada is contracting out for the 2006 Census is approximately 126 million Canadian Dollars (EUR 90 million), which represents about 25% of costs. Confidentiality of data is such a strong issue in Canada that only Statistics Canada staff handle completed questionnaires and process data. It is pointed out several times that all questionnaires and data are processed in Statistics Canada facilities, located in Canada and that at no point does any contractor handle or possess confidential census responses.

4. Outsourcing as a special census topic still appears only rarely in different international meetings. The report of the UN Symposium on Population and Housing Census, New York, September 2004<sup>4</sup> dedicates one single paragraph to that topic. At the 22nd Population Census Conference organized by UNSD<sup>5</sup>, the outsourcing was presented as questionable.
5. Doubt about outsourcing was expressed from the following points of view:
  - (a) as a conflict of interests between public (statistical office as part of government) and private sector (providers of services);
  - (b) how to ensure privacy and confidentiality of data and deal with possible misuse;
  - (c) how to maintain public trust in statistics;
  - (d) problems related to preparation of contracts and legal arrangements.

### III. OUTSOURCING THE 2002 CENSUS IN SLOVENIA

6. The above-mentioned questions and dilemmas were seriously discussed among the persons responsible for the 2002 Census in the Statistical Office. This was one of the reasons that the whole process of hiring external contractors was absolutely transparent and all mutual obligations and responsibilities on both sides were precisely defined in all agreements. This document presents the main activities of the Statistical Office which were important in view of the outsourcing of the 2002 Census. The starting point was the experiences of outsourcing, which will be more closely examined from the point of view of effectiveness, time consumption, quality of services provided and expenditure adequacy.

7. In the organization and implementation of the 2002 Census, there were three areas of activities where it is possible to talk about outsourcing in the formal meaning but the real outsourcing is, in our opinion, only the last stated activity:
  - (a) contracts with suppliers of services in the preparatory phase;
  - (b) organization of field enumeration;
  - (c) public tender for partnership on data processing (including printing of questionnaires, pre-printing of data to questionnaires and distribution of questionnaires to and from the field enumeration).

#### A. Contracts with suppliers of services in the preparatory phase

8. In principle, this represents classical cooperation between a contracting authority and a tender as used in previous censuses, but in the 2002 Census this process was very transparent. There were several public tenders that are compulsory for all institutions of the public sector. The main advantage is competition (a greater number of suppliers), a broader range of offer and better prices. The only weakness of a public tender is that it is more time consuming, especially if one of the tenders decides to make an appeal if they are not chosen. Most public tenders were of small value, and some services were very specific (there are only a few companies which are able to provide such service). All public tenders were carried out in due time and we didn't have any problems with complaints. The most important tender in this sense referred to the supply of information technology where 11 different providers were included.

9. Some important public tenders:

- (a) cartography of the 2002 Census – printing over 16,000 maps of enumeration units in scale 1:1000 to 1:10000 with ground plan of buildings with street numbers;
- (b) different promotion material (bags, logotypes, posters, delivery of promotion leaflets to households, caps for enumerators);
- (c) information technology (90% hardware, 10% software).

10. The total expenditure for information technology was SIT 500 million (slightly more than EUR 2 million) or 21% of the budget for the 2002 Census. The infrastructure is now also available for the regular duties of the Statistical Office.

#### B. Organization of field enumeration

11. Field enumeration is traditionally carried out with the help of a number of temporary staff. It is also the most expensive part of the census, representing one half of total expenditure in the 2002 Census.

12. The major changes in the administrative-territorial structure of Slovenia in 1995 influenced the decision which spatial structure is the most appropriate for organising field enumeration. There were 192 municipalities as units of local self-government and 58 administrative units as branch offices of the central government. Despite the fact that Slovenia is a small country (just over 20,000 km<sup>2</sup> and about 2 million people), the differences in total population between municipalities is enormous (from 400 to almost 300,000 inhabitants). On the basis of field enumeration experiences in previous censuses, we decided to prepare a new organizational structure (census centres), mostly connected to the borders of administrative units. In some cases, certain administrative units were joined together or divided so that the burden for census centres was distributed more equally.

13. In the 2002 Census, we didn't change the hierarchy of the organizational structure concerning the responsibility of staff and staff education. The top position belongs to the so-called state instructor, who was responsible for the methodological correctness of fieldwork and for educating all lower level staff in one centre. State instructors were chosen by the Statistical Office mainly from its regular employees. The second level was represented by the local census commission (covering mainly organizational issues – selection of all staff and financial management) and field instructors who were mainly responsible for the quality of data collection.

14. The most important novelty, which later proved very successful and effective, was the decentralization of financial management. The Statistical Office concluded a contract according to which the local census commission was fully competent to manage the allocated budget. At the same time, this was a great contribution to local budget and local commissions were more likely prepared for work overload. The main advantage for the Statistical Office was that it was relieved of the large amount of paperwork for the staff of more than 10,000. Also, local representatives are more familiar with the situation in the field. The only negative aspect, which was noticed later, was the realisation that staff at the second level were chosen according to their acquaintance with the persons in local census commissions and not according to their abilities.

15. The 2002 Census field enumeration experience shows that in the next census (if we can not prepare the census only from administrative and statistical sources), more attention should be focused on:

- (a) simplification of census questionnaires and pilot testing of questionnaires by the staff;
- (b) better selection of second level staff (students are the most appropriate);
- (c) a more important role of field instructors and how to stimulate them for better quality;
- (d) a new concept of education of staff which should be adjusted to the role of staff in census fieldwork.

16. It should be pointed out once again that the organization of field enumeration is not outsourcing in the real sense. The providers were not selected through public tender; it was simply the decentralization and rationalization of work of different government institutions.

C. Public tender for partnership on data processing (real outsourcing)

17. The decision to outsource an important part of census activities to an external subcontractor was mainly taken because the Statistical Office faced:

- (a) limited human resources in a period of political decision to decrease the number of employees in the public sector;
- (b) very limited time for all census activities;
- (c) deadline determined by the Census Act for final results.

18. The Statistical Office was aware of the potential risk because the selected private company would handle confidential data from statistical and administrative sources and collected from the field. The questions on nationality and religion were reviewed even by the Constitutional Court and special rules were applied for collecting those data in the field. On the other hand, we were aware of the possible negative reactions in the public opinion about outsourcing sensitive data. For these reasons, the provisions of the contract devoted full attention to confidentiality and how to handle sensitive data. Penalties for any misuse of data were very exactly determined. Every person working on the project 2002 Census processing data employed by the contractor had to sign a special statement. The same rules as for the employees of the Statistical Office were applied.

19. The Statistical Office of the Republic of Slovenia invited public tenders by announcement in the Official Journal of the Republic of Slovenia in June 2001. A potential partner was obliged to offer complete service according to the tender. There were three main components of the tender:

- (a) design, printing and personalisation of census questionnaires;
- (b) distribution of census material for fieldwork and collecting and storing the material after enumeration;
- (c) data processing, including optical reading, verification of data, coding, online consistency check supported by images of questionnaires.

20. The company selected by public tender had to provide complete hardware and software technology (their own or rented), adequate number of staff and had to meet the deadline (15 November 2002) for the transmission of the database to the Statistical Office (just 7 months after finishing field enumeration). The Statistical Office was obliged to prepare all coordinates

for processing data (mostly already published in the public tender), offer methodological help to experts of the contractor and cooperate in staff training.

21. All basic demands of the Statistical Office for data processing were briefly presented in the public tender. Some of them are mentioned here:

- (a) download of data from the pre-census database (prepared by the Statistical Office), storage of those data and personalization of questionnaires with data from the pre-census database;
- (b) determination of uniform identifications and barcodes for later merging and coverage control and printing of all identifications to the questionnaires;
- (c) setting up an optical archive of images of all questionnaires for later paperless processing of data;
- (d) simultaneous verification and automatic coding of specified data;
- (e) online consistency check supported by images of questionnaires.

22. Only two private companies competed in the tender. The lower price was offered by Cetus Celje: the company was capable of providing a complete service for SIT 360 million (approximately EUR 1.5 million) or about 15% of the total budget for the 2002 Census. It was very important that their first calculation be correct and no additional expenses would occur. The selected company cooperated for the first time with the Statistical Office. It had no references regarding the processing of such a large amount of data, but it was well known for its printing of different forms and of lottery tickets. Because of the limited time, it was not possible to carry out any kind of pilot. The close cooperation started in September 2001.

23. Some basic information about the work done:

- (a) total number of printed questionnaires = 6.6 million (13 million of pages A4);
- (b) 4.5 million personalized questionnaires (with printed names, addresses, identifications, barcodes and remarks about data found in the pre-census database) – for personalization, a two-sided inject printer with speed of 100 meters per minute was used;
- (c) the scanning of all questionnaires was done by four highly operable document scanners for A4 pages - the total number of scanned images was over 14 million; it was finished in 2 months in two shifts with 4 employees per shift;
- (d) the optical photo archive of all census questionnaires was created for further processing and also for digital archiving instead of a classical paper one;
- (e) the software Eyes&Hands from Readsoft for recognition and verification and automatic coding was upgraded using own solutions – optical recognition was the most time consuming phase of the work, lasting for 5 months on only 12 workstations (personnel computers) and 12 staff per shift;
- (f) correction of data - previously the most demanding part of processing consisted of formal checks, logical checks and inconsistency checks - was finished in only 2 months on 12 workstations in 3 shifts with 4 employees per shift (one operator managing 3 PC's at the same time);
- (g) some phases took place simultaneously;
- (h) the entire concept of the methodological design of the census and data processing also enabled us to control for the first time the double counting of enumeration of individual persons, to check the people who were not enumerated for various reasons, and impute data from administrative and statistical sources to the final 2002 Census database.

24. Some important characteristics of cooperation between the Statistical Office and the contractor Cetis Celje:
- (a) small number of experts involved in the project (four from each part);
  - (b) great enthusiasm of staff involved;
  - (c) very short time for the whole data processing (7 months);
  - (d) trust between two partners and awareness of the responsibility for success;
  - (e) confidence in own knowledge despite a completely new way of processing of census data in Slovenia;
  - (f) current solving of problems that appeared often, optimisation of all processes and introducing innovative solutions to all processing phases;
  - (g) fulfillment of contracting duties of both partners in full.
25. Some advantages of outsourcing of processing data of the 2002 Census for the Statistical Office:
- (a) there was no expenditure on expensive hardware which is used only once (e.g. scanners) while the private company can later, also according to references from census, sell this service on the market;
  - (b) less burden to expert employees of the Statistical Office, who had more time for methodological and dissemination work, resulting also in a very useful website devoted to the 2002 Census only (available also in English <http://www.stat.si/popis2002/en>);
  - (c) information technology experts had enough time to prepare all the necessary infrastructure for data storage, to realize all procedures and prepare software applications for statistical upgrade of the census database;
  - (d) transfer of knowledge to regular activities of the Statistical Office and introduction of some new software (e.g. MS OLAP) for non-IT experts as a very useful tool for data analysis and dissemination;
  - (e) most of the employees hardly noticed that the most demanding statistical survey was taking place, unlike the case in previous censuses.

#### IV. CONCLUSION

26. The Statistical Office considers that the 2002 Census was a success story and that outsourcing was the best solution in such demanding circumstances. We are aware, despite some initial hesitation about the selected tender, that we chose the right partner. The outsourced services were very proper in terms of data quality, time needed for processing and in terms of costs. For the very first time all final results were available just one year after finishing enumeration.

27. At the same time, the Statistical Office managed to keep the public trust because no misuse of data was recorded. The whole project was conducted transparently. The Statistical Office has also published a comprehensive final report on the 2002 Census, including activities that were taken, contractors involved in the project, organization of field enumeration as well as very detailed data on budget and expenditure. The Government of the Republic of Slovenia accepted the report without any comment and it is also available to the public on our website. To sum up: outsourcing was the best and most reasonable decision to have taken in our circumstances.

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<sup>2</sup> Outsourcing the 2001 Census. National Audit Office. London, 2002.

<sup>3</sup> <http://www12.statcan.ca/english/census06/info/outsource/faq.cfm>

<sup>4</sup> [http://unstats.un.org/unsd/demographic/meetings/egm/Symposium04/docs/AC97\\_L4.pdf](http://unstats.un.org/unsd/demographic/meetings/egm/Symposium04/docs/AC97_L4.pdf)

<sup>5</sup> <http://www.ancsdaap.org/cencon2005/Papers/UNSD/UNSD.Srdjan.Mrkic.slides.pdf>