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THE USE OF REGISTERS IN POPULATION, HOUSEHOLDS AND HOUSING CENSUSES IN SLOVENIA

Submitted by the Statistical Office of the Republic of Slovenia (SORS)[1]

Summary

This paper deals with the use of registers in population, households and housing censuses in Slovenia. A short background on history and current development of register-based statistics in Slovenia is presented.

The infrastructure of administrative registers (the Central Population Register, the Business Register, the Register of Territorial Units with geo-coded addresses and universally used identification numbers) has been developed taking into account the experiences of the Nordic countries. Administrative registers and records in Slovenia were already used in the 1991 census and they are planned to be used as much as possible in the 2001 Census.

The Act on National Statistics provides the legal base for the access to administrative records at micro level, their linkage by use of the ID numbers and development of the statistical registers as an intermediate flexible tool for production of statistics. The Act on Organisation and the Field of Work of the Ministries (1994) stipulates that the Ministries set up, keep, maintain and provide horizontal linkage of data records within their authority into common data bases which serve for administrative purposes and also for the implementation of the National Programme of Statistical Surveys.

Statistical registers and data files which are planned to be used in the 2001 Census were already partly tested via the Census Pilot Test in April 1998 and have been also tested in the production of current statistics. Some additional verification tests of administrative records to be used in the 2001 Population Census will be performed.

Using registers data by means of GIS technology gives the opportunity of better preparing the census field work and allows dissemination in a more flexible user-friendly way. The quality control issues are mentioned on.

This paper, which also focused on the future work needed in order to make possible in the future a totally register-based census and proposes some points for further discussion.

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I. Background

1. The population, household and housing censuses have always been one of the most costly and professionally demanding operations in statistical offices. In order to reduce the costs and improve data quality and timeliness, statisticians have proposed the replacement of the traditional questionnaire-based censuses with the use of the administrative sources available in the public administrations. Some countries, such as Finland, Denmark and the Netherlands have already totally replaced in such way the traditional censuses. Other countries, for instance Sweden and Norway, use administrative records very intensively and plan to introduce a register-based census in the future. And still other countries, like Israel, have acquired experience on how to use administrative records in conducting the census.

2. Slovenia has been developing, namely in co-operation with Nordic countries, a register-based statistical system since the 1970's and has already gained some experience in this field. In 1983, with a legislative decision, the basic registers in the field of population, businesses and territory were pronounced to be common data bases. This was facilitated by the introduction of ID numbers (especially PIN in CPR in 1980).

3. The Act on National Statistics from August 1995 gives the SORS (i.e. Statistical Office of the Republic of Slovenia) an even stronger legal position in order to co-ordinate the statistical activity in Slovenia. The SORS has legal authority to encourage the state administrations to use the common standards (ID numbers, classifications and definitions) and to give their opinion to newly-introduced methodological concepts in data collection throughout the country in order to use the data for statistical purposes and especially to provide census-type data.

4. The Act on Organisation and the Field of Work of the Ministries (1994) stipulates that the Ministries set up, keep, maintain and provide horizontal linkage of data records within their authority into common data bases which serve for administrative purposes and also for the implementation of the National Programme of Statistical Surveys.

3. Censuses have been very important for the establishment of new registers. Legal provisions for using statistical data to establish administrative registers in Slovenia have to be defined by law.

II. Setting-up administrative registers and records in Slovenia

4. Acting on the basis of and in compliance with the Act on Social System of Information (1982) and supported with the know-how from the Nordic Countries, the SORS was the driving force both of the development of administrative registers and records in a standardised way and also of their integrated use for statistical purposes. In setting-up and maintaining those registers the SORS has co-operated with other state bodies, ministries and partly with the research community. The infrastructure of registers concerning population, territory and businesses has been set up in co-operation between the SORS, the Ministry of Internal Affairs (MIF) and the Geodesic Administration (GA). The SORS presented the Slovenian register-based system also in international meetings. The latest paper describing the brief history of administrative registers in Slovenia was written by Mr. N. Schlamberger, 1998.

II.1 The Central Population Register (CPR)

5. The SORS has been maintaining the CPR since 1983. The history of registers, in fact, goes back to 1946 when the local registers of resident population were set up in Slovenia and they were used for the census of 1953. For the 1961 census, a revision of these registers was made. In 1965, the legal base was adopted for the Register of Resident Population, whereas in 1970 the Act on the Central Population Register (CPR) was passed. The identification key in the CPR is a common personal identification number (PIN) that has been introduced by law in 1980. In 1983 the Law on Social Information declared CPR as one of the common infrastructure registers and PIN as a standard. The use of the PIN is obligatory for most government bodies that keep records dealing with persons (employment, pension and health insurance, health care, tax records, etc.). In 1990 a very strict Law on Data Protection was

adopted as legal foundation to guarantee the data on the population. In 1998, a new Act on the Central Population Register was passed. As a consequence, besides covering the population with permanent residence, the Slovenian citizenship covers also foreigners and includes some new attributes and more precise rules for data providers to the CPR as well as for data users. The PIN is also dealt with by the same law. In August 1998 the responsibility for CPR was - according to Act on National Statistics - transferred from the SORS to the Ministry of Internal Affairs. The SORS will keep using the CPR for statistical purposes.

II.2 The Register of Territorial Units (RTU)

6. The RTU was created for the 1981 Population Census and originated from the statistical cadastre, set up in 1953, as a result of the co-operation between the Geodesic Administration and the SORS. Beside administrative territorial units, the RTU also includes all streets and house numbers which uniquely cover the whole territory of Slovenia. Research work in assigning the centroids began in 1973. The fieldwork was performed by surveying and mapping authorities and was completed in 1991. The Surveying and Mapping Authority assigns the identification to each new building (residential or business). The identification consists of the address, parcel of land, other administrative units, geolocation (x,y) of the building for each of approximately 460,000 buildings (post codes). The centroid is therefore at the same time a code (geoposition with co-ordinates) and an identification of the territorial unit. With the centroid - which has a role similar to that of the PIN - the data collected for any geographic unit can be identified. The RTU was extremely useful already for the elaboration of maps and list of addresses in 1981 and in 1991.
In 1995, however, a multi-purpose administrative data base was established, linking 3 registers: the land cadastre, the CPR and the Business register. One of the most important users are the tax authorities. This data base was one of the most important bases for setting up the statistical farm register and the sampling framework for all agricultural statistics as well.

II.3 The Slovenian Business Register (SBR)

7. As required by the regulations of that period, the Register of Organisations and Communities (ROC) was set up in 1976 and was the first ancestor of the Slovenian Business Register (SBR). Separately, the Common Registers of Crafts (CRC) was in 1985. In 1995 the Act on the Slovenian Business Register (SBR) was passed. The register contains records of all the business entities in Slovenia regardless of their legal or institutional form. The business entities are identified by a unique business identification number (BIN).

II.4 The Administrative Records on Social Security Provisions of the Population

8. Every employed or self-employed person in Slovenia has his/her health insurance and is also insured for retirement. After the 1983 Employment Census the following state institutions, namely: the Social Security Office, the Pension Fund, the Employment Office, the Tax Office, the Institute for Public Health and the SORS agreed upon the common administrative form which must be submitted to the Regional Social Security Offices by all employers. The data entry and editing is performed once for all institutions involved. The agreement upon common methodological concepts (the administrative form ID numbers and codes from CPR, RTU and BRS) is of essential importance. The methodological standards are prescribed by the Ministry of Labour and Family Affairs in agreement with the SORS and other co-operating partners. The SORS maintains the Statistical Register of Employed Persons (SRE) which is used for statistical purposes.

II.5 The Administrative Records on Unemployed Persons

9. The register containing the data on job-seekers was set up in 1992. The data are collected through the 60 regional Employment Offices and are kept centrally by the Central Employment Office. With the last change in the law, the term "job-seekers" was replaced with the term "unemployed". This coincides with the change of the requested criteria for a person to be considered. The current definition is much closer to the international ILO definition, but it still differs, as it presents only the formal status

in employment. The SORS has used the above-mentioned records for the calculation of the so-called administrative unemployment rate and the monthly unemployment statistics. These records can be used in the 2001 Census directly, instead of having to ask for the employment status, or they can be used for quality control.

II.6 The Records on Students (undergraduate and graduate)

10. In the academic year 1985/1986, the University of Ljubljana, the University of Maribor and the SORS agreed to develop a common questionnaire on student enrolment. Thus, a signed permission is given by every student, granting the use of his/her questionnaire for employment purposes also. Until then, the students had to fill in two forms: one for the university and the other for the SORS. The multipurpose data base with ID numbers, common classifications and definitions is maintained by both universities and serves also to the SORS for conducting surveys on students (undergraduates and graduates). It has been used for administrative purposes as well. The data are of good quality and can be used in the 2001 Census.

II.7 The Records on Retired Population

11. These records are kept by the Pension Fund and contain ID numbers which make it possible the linkage with other registers and the use for the 2001 Census.

II.8 The Records on Refugees

12. The records on refugees are kept by the Office of Immigration and Refugees and the Ministry of Internal Affairs and were set up after the Census of refugees in 1993 which was prepared also with the assistance of the SORS. The legislation in this field gives the obligation to state administration to keep records on micro level and gives the SORS the possibility to get the data for statistical purposes. Currently data are already used in population statistics.

III. Statistical registers

13. As already mentioned, the development of administrative registers and records in a standardised way and their integrated use for statistical purposes was mainly driven by the SORS. The main purpose of the described administrative registers and records is tused for administrative purposes, but they are being used for statistical purposes as well. Having legal access to all administrative data collections needed for statistical purposes at micro level, the SORS has been maintaining the statistical registers, matching the data from administrative sources and surveys at micro level by using ID numbers. Already in the previous state the legislation supported the development of administrative records and their linkage for statistical purposes. Statistical registers have been derived from administrative registers and combined with other sources (surveys or other records) in order to fulfil the requirements of statistical production.

14. There are a number of statistical registers and data bases which are being used for current statistical production and for censuses. Let us describe some of the most important ones for the census purposes:
(i) The statistical register on population contains the data from CPR (citizens and foreigners), records on refugees, and others.
(ii) Records on social insurance are the source for the statistical register of the employed.
(iii) The statistical register of territorial units and the statistical business register are derived from administrative registers and combined with other administrative registers and records in the field of population data. The data of the Register of Territorial Units have been used for the preparation of census cartography and of the lists of addresses for fieldwork.
(iv) In order to collect the data on economic characteristics of population, we are combining data of two statistical registers: the statistical business register and the SRE.

(v) In GIS there are a few statistical registers: the tax register, the car register and the data from 1991 census were integrated, using the centroid as identification and PIN, BIN numbers as well, in order to present data in geographical dimension, too.
(vi) By combining all already mentioned registers with the tax register and household budget survey we produce household income statistics - the pilot and the concept were presented in IAOOS Conference in Island 1996 (I. Krizman 1996).

15. In the Population Census Act for 2001 a setting-up of dwelling register will be laid down. The data obtained from Population Census will serve as base for administrative Register of Dwellings. The statistical Dwellings register, derived from the administrative one, will be used for housing statistics and to carry out future population and housing censuses almost completely from registers and administrative sources.

IV. Register-based census as final objective

16. The strategic orientation has been decided in Slovenia: to use the administrative sources to carry out Censuses and surveys as much as possible already after 1981. Taking into account the ideal situation, i.e. to have complete register-based census as final objective, two main issues have to be addressed:

- the use of data from the existing registers and databases,
- the use of census data for setting-up new registers.

In the 1991 Census, the SORS used registers and records; pre-printed the questionnaires and took some data directly from registers.

V. Use of registers and administrative records in the 1991 Slovenian Population Census

17. When implementing the 1991 Census, Slovenia took advantage of the modern technology in data entry and editing and on top of this also used the available administrative records: the Central Population Register, the Register of Territorial Units, the Register of Business entities and the Statistical Register on Employment (SRE), disregarding the fact that at time of the census Slovenia was formally still part of the former Yugoslavia. Some attributes from the administrative CPR were used (municipality, census district, name and first name, address - settlement, street and street number, personal ID number (PIN) and the number of questions already answered by having data in SRE). For all persons who were found in the field and for whom there were no pre-printed data, the enumerator had to fill in an empty questionnaire.

VI. The 1998 Pilot Census

18. Within the preparation for the 2001 Census, in the first half of April 1998 the SORS carried out the Pilot Census of Population, Households and Dwellings. The results and achievements were presented in 1998 at the Bled and Dublin meetings..

For the purpose of this paper we would like to discuss two objectives of the pilot, namely:
(i) How and to what extent will it be possible to use the existing administrative sources for the 2001 Census?
(ii) Can the existing maps and the GIS be used?

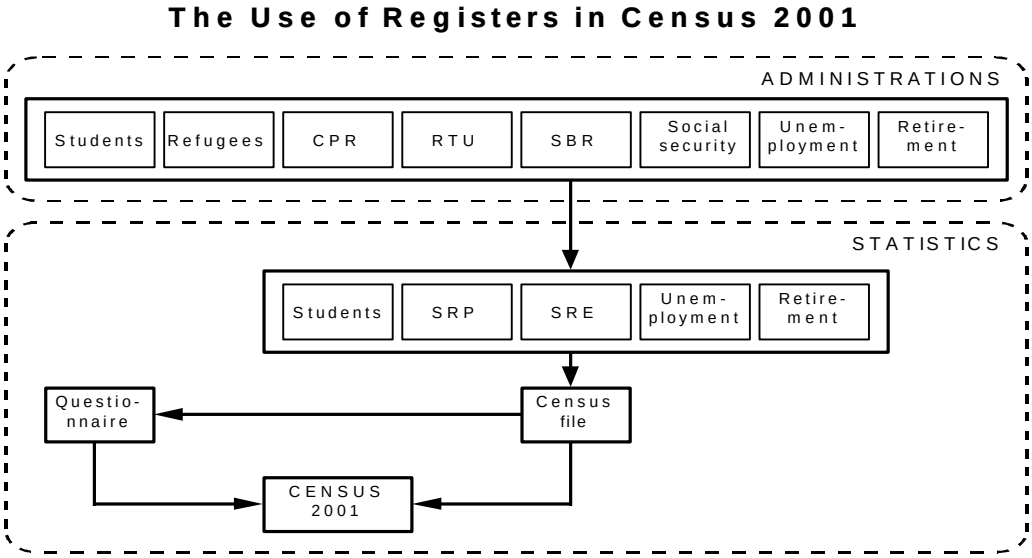
19. As already mentioned, the SORS is maintaining the Statistical Register of Employment (SRE). It contains the variables describing the economic characteristics of employed and self-employed. By using the personal identification number (PIN) we can link labour variables like: occupation, educational attainment, temporary and permanent employment, shift work, full- time and part-time work, etc. From the CPR, we can use variables like sex, age, residence. By using the business identification number (BIN) from the business register we can derive the activity of the enterprise, number of employees, location and ownership. Three variables (educational attainment, occupation and activity of the enterprise) were tested for use from SRE instead of being asked via questionnaire. In general terms the

conclusion is that the SRE was estimated to be a fairy good source for the next census. Some work on quality and updating will be required, especially concerning variables like occupation and educational attainment and the employees in agriculture. We are discussing the possibility of using the 2000 Agriculture Census in order to improve the quality of the SRE in this field.

20. Secondly, the available cartographic material - especially the cartographic material for enumerators was estimated not good enough. A project has been set up in order to prepare a new organisational and software solution.

VII. The Use of Registers and Records in the 2001 Census in Slovenia

21. Following the decision of making the most widely possible use of the administrative sources, the picture below describes their potential use in the 2001 Census where also paper-based questionnaires will be used.
There are some important administrative sources which shall, together with census data, facilitate the creation of new statistical data bases. There is possible linkage of 2001 census results and the data collected from electricity providers using electricity meters as ID numbers. The records from the land cadastre co-operative database and others will also be a subject of further examination in combination with census results.



VIII. Quality control issues

22. In order to improve the quality of data derived from administrative sources, in 1990 the SORS undertook a series of different quality control checks. The administrative files were examined in the field together with the regional offices of the Ministry of Internal Affairs, the geodetic offices, the personnel and accountant staff of the enterprises. Even though some of the data were pre-printed in the 1991 Census, the enumerators had to check all data in the field and correct or add the missing items or units. A post-enumeration Survey was conducted as well. Unfortunately the 1991 Census was interrupted and discontinued due to the ten-days war in Slovenia in June 1991, causing a lot of problems, and also some loss of data quality. We also observed some problems when using the data from registers, especially in cases when the people were not living at the official addresses from CPR.

23. As already mentioned, in the 2001 Census we are going to use all the above-mentioned administrative sources. The big difference - in comparison with 1991 - is that we have been doing much

more work on statistical registers. This is extremely important since we want to cover the international standard definition of population. The CPR, the only source for pre-printing in 1991, would be combined with the data from the refugees office, foreign citizens and other group of persons. The information on the availability of the data on economic characteristics in SRE and others registers will be added.

IX. GIS technology as a tool for Collection and Dissemination

24. The GIS shall be used as basis for elaboration of maps for the enumerators' fieldwork. These maps will be prepared on the basis of the official topographic maps 1:5000 with inscribed census districts and all the buildings. The lists of addresses and persons living at these addresses will be provided as well.

25. Slovenia has been in practice implementing the Recommendations on setting up the Geographic Information Systems (GIS) for the needs of national statistics, that were accepted at the ECE/CES Conference in June 1995 in Geneva. The work started twenty years ago and was mainly promoted by Mr. T. Banovec, currently Director General of SORS. There are several papers describing the GIS in Slovenia. In one of the latest (T. Banovec, 1996) the GIS is used to support regional accounts.

26. In the social field it is possible to collect through censuses, records and other methods, about 100 titles of attributes with as many classifications and definitions per person. A person is also an economic being who is linked to a registered employer via his social code (PIN). In this way we can gather many important data on his/her employment status, payment of taxes, occupation, performed and similar.

27. The GIS software is a successful result of the co-operation between the SORS and some private software companies. The development of the software started in 1989 and is being updated constantly. All the data that apply to the level of house number can be loaded in the data base and linked together in order to be represented territorially.

28. So far we have linked together the data from the 1991 Census (population, households, agriculture, dwellings), the SBR and CPR, whereas data regarding taxes, property and elections have been added. Time series are important to show the development of a certain territorial unit, therefore the inclusion of the data from previous censuses is planned.

29. Practical value of our GIS-Technology (GIST) is: speed, exactness of the territorial location of the phenomena, analytical help in data modelling and visual presentation. In short, it is a good tool for professional work and for statistical dissemination. Any optional demand for the included data one can think of, is easily fulfilled. It is simple to define options and even more simple to choose the territorial units - only by encircling the territory. The results are simultaneously presented on the screen.

30. As mentioned above, the exactness of the territorial location is grounded by means of the data from the Register of Territorial Units and geo-coded Postcodes. The GIST acts as a useful geoanalytical and decision-making tool in geographical - analytical space. It is used by the SORS and other institutions. One of its most successful tasks was performed during the discussions about the new territorial administrative division of Slovenia, while in future it could support the formation of new regions. The visual presentation of the data is another important application of GIST which, however, must be considered with caution.

31. The GIST has been used for conferences, government commissions, professional fairs and lectures. However, we have ambitious plans for using it as a dissemination tool to the mass media, too. The GIST will help us improve the quality of the press conferences. Its enrichment of the presentation of the data by visual applications is and will be useful for publications, television programmes and for the public in general. Following the statistical principles on the protection of personal data, it must be said that GIS is used for statistical purposes only. Whenever the data are shown to the public or used outside the statistical office, the protection of individual data is guaranteed.

X. Census for setting up new registers

32. The use of censuses for setting up the administrative registers in Slovenia must be supported with the proper legal base (e.g. the act on census has to describe all the variables which will be needed for establishing a new register and the main objectives of such work). Later on, a special law is needed to establish a new register. The CPR was established after the 1981 population census. A multi-purpose administrative database with all health/pension insured persons was set up after the 1986 employment census. The Law on Census (1991) defined the multi-purpose use of housing and agriculture sets of data. It stated that data collected with the census had to be used for setting up two administrative registers: the register of dwellings and the farm register. The data were collected and made available for the above-mentioned purposes in order to reduce the costs for the 2001 Census.
Both registers, however are still in the preparation stage and could not be used in the 2001 Census, as it was planned.

XI. Future plans

XI.1 Real Estate Register in Slovenia

33. In Slovenia the idea of the Real Estate Register (RER) has been developed for many years. The initiator of this proposal was Mr T. Banovec.

The EU requirements push the project ahead. Even if the RER as a whole can not be established immediately, its parts should be constituted in a way as to establish grounds for a future uniform and inter-linked RER. The register of buildings of Slovenia should be considered as a part of the real estate register. This holds true for local communities' local registers of buildings as well as for the Register of Buildings (ROB). The register of dwellings should be only one part of ROB. The register of buildings includes the register of dwellings and, in addition, business offices and similar.

34. Buildings include all kinds of buildings (residential, mixed, business), while low constructions, such as roads, squares and bridges are considered in a special category. The greatest part of the Real Estate Register of Slovenia is a centrally managed, informatized land cadastral register, which includes around 6 million parcels of land, and is available not only to central users but also to new local communities which have been, according to the newly adopted legislation, given access to all the previously mentioned registers. Nevertheless, some functions of larger users will need to be taken into account and, thereby, also the basic functions of the application outlined (support to these functions). It will also have to be determined which data are to be collected in such centrally managed informatized registers.

35. Each real estate object, charted or not charted, measured or only outlined, can be given a centroid. The centroid can be given also to an object only conceptualised or planned, to a residential building without a house number, a stable, a planned parcel after parcelization, a piece of land, etc.

36. Physical and legal changes regarding the objects, which are a result of demolition or reconstruction at the same location, require only methodological agreement and a new centroid for a new building can be acquired, while the old centroid is entered in the "historic" file.
Centroids for the house numbers (EHIS) have already been made, and their use has been since then very successful (this year more than 150 free copies of this base were given out by the GA of RS and the SORS). It is expected that centroids will become an identification or a "registration number" of real estate units, i.e. parcels of land, buildings and other constructions.

XI.2 The Records on Education

37. The second project to be further developed concerns the education records. Currently, as already mentioned, administrative records on students are available. At the last Steering Committee on education statistics the PIN was proposed to be included in all records throughout the school system which will make possible research work in observing longitudinal changes, and lessen the burden in

regular education surveys and in future censuses as well. According to the very strict Law on Data Protection, the PIN has to be introduced to education records by law. We might expect some discussions concerning PIN.

38. The Dwelling Register and the educational data file, together with the registers and records, will make it possible for us to conduct a totally register-based census in Slovenia.

XII. Some points for discussion when using registers in census

39. The most important points in using registers and other records combined with questionnaires might be addressed as follows:

(i) Legal provisions of the statistical office to have access to administrative records, their influence to introduction of common standards to all data collections and their legal foundation to combine the data from different sources at micro level.

(ii) Insufficient maintenance of selected registers and collections which cover and document different phenomena, and insufficient detail in the data where only approximate results are available (maintenance, aggregations, reductions by way of summaries and abstracts). Many new informatization projects neglect completely the problem of maintenance, which should have been solved before and in accordance with the informatization. A multi-purpose use of data from the co-operative database can reduce the costs.

(iii) The quality of the sources is one of the most important issues. The quality can be evaluated in using administrative sources for the compulsory production of statistics. The beforehand verification of all the records can be done in the field in order to lessen the burden during the census. Those activities are necessary when the available records cover the expected population but are not of sufficient quality. Pre-printing of data from the records must be sent to respondents and we should ask them for the corrections. This is of great importance when we plan to develop a statistical register to be used in other surveys.

(iv) The time consistency between sources in the preparation of the census file should be strictly taken into account. Some inconsistencies might appear due to postponed registration of some events in administrative records. Post census analyses have to be carried out in order to identify the differences between the census critical moment and the reference time of the records.

(v) Consistency is necessary in the application of statistical definitions and classifications. Usually administrative sources cover the de jure status of the registered units. In order to cover the de facto status of the observed population in the census, some statistical work on those records should be done at micro as well as at macro level. In order to get information on variables which cannot be possibly derived from records, questions have to be asked by questionnaires. A cost-benefit study has to be done for every added variable.

(vi) Verification of pre-printed data in the field during the census might cause new problems when enumerators forget to census possible missing persons not registered at the place of census or simply not registered at all. This was one of the problems of the 1991 Census in Slovenia.

(vii) Two open questions are: What has to be done with the missing values (unit and item non-response)? Should they be imputed from other surveys (like Labour Force Survey), or using cold deck or hot deck imputation?

(viii) The most efficient use of modern IT makes it possible the fully complete informatisation of the whole process of census including the combination of census files derived from statistical

registers and data collected using questionnaires. Lack of efficient procedures for the processing of data from various, sources of data connected each other might results in poor quality of the census data.

(ix) Using registers demands strict respect of statistical data confidentiality rules, which means in principle, the one way flow of micro data from administrative authority to Statistical Office and not vice versa. Census results can be used for setting up administrative registers only in the case of legal authorization. Even when individual data are linked between different sources, the data protection law must be respected.

XIII. Conclusion

40. The use of registers in the 2001 census in Slovenia will be very intensive. The SORS has been co-operating with different ministries and public offices in order to improve the quality of administrative sources. The strategic decision to build statistical registers as interface between the administrative sources and the use for surveys as well as censuses requires the legal autorisation to collect the data at micro level, link them using ID numbers and harmonise concepts, definitions and classifications at least for statistical purposes. All this has resulted in the achievement of a considerable rationalisation and better quality. The solution of non-response problems and the prevention of enumerator's influence on results are important quality issues. The basic quality of the sources and the consistency also have to be taken into account. The paper presents the possible solutions in the case of Slovenia, but some of them have to be further discussed before taking the final decision.

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