

sources. The solutions developed in these population censuses laid the foundation for a totally register-based census solution.

3. In this presentation I will describe the development process of a register-based census system and the conditions that need to be in place in order to move over from a traditional census and adopt new methodology. My intention is also to encourage other countries to introduce administrative registers and develop their utilisation in population censuses, even if a totally register-based solution was not possible, because they help to rationalise the census process, reduce costs and improve the quality of data. I will also talk about Finland's experiences of using register data and in the end describe Finland's register-based population and housing census system from the viewpoint of the essential features of population censuses according to the UN population census recommendations.

I. THE DEVELOPMENT PROCESS OF A REGISTER-BASED POPULATION CENSUS

4. In Finland systematic use of administrative register data had already been made whenever possible starting from the 1970 population and housing census. The Central Population Register was set up in Finland in the late 1960s, and it was not yet fully exhaustive in 1970. The personal identity code had been taken into use in 1963. From the first the register included also domicile codes that identified dwelling units. All persons living in the same dwelling had the same domicile code. The names and addresses in the register were used for pre-filling the census questionnaires. The census was a conventional questionnaire census and the number of population was determined on the basis of questionnaire data. Information was already then linked to the census data on people's religious groups from the Population Register and on income from taxation registers.

5. In connection with the 1970 population census, map co-ordinates of buildings were collected jointly with the Population Register Centre that maintains the Central Population Register. The map co-ordinates were entered in the Register and have since been updated there with the help of municipal building authorities. This provided a sound foundation for the future development of regional and geographic information systems.

6. On the basis of information on qualifications collected with questionnaires in the 1970 census, Statistics Finland set up a statistical Register of Completed Education and Degrees, which has after that been updated yearly by new information on qualifications provided by educational institutions. Since then information on the population's qualifications has been produced by means of the Register of Completed Education and Degrees. Information on qualifications in the Register of Completed Education and Degrees is also linked to Statistics Finland's survey data and thus it is not necessary to ask it separately from respondents in different surveys.

7. In the interim population census of 1975 increasing use was made of the Population Register in addition to questionnaire collection, because the register's coverage and reliability had improved. Nearly all demographic information of the population derived from the Population Register. The number of population was also defined on the basis of register data. More income information than before was also obtained from the taxation data. After the 1975 population census a solution was designed for producing information on the population's

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families and household-dwelling units by means of the Population Register. With the help of link data describing the domicile, parents and children of each person included in the Population Register, a register-based family statistics system was developed, which has after that replaced collection of family data with questionnaires.

8. Starting from the 1975 population census, Statistics Finland's Register of Enterprises and Establishment, or the Business Register, was used for producing information about the workplaces of the employed labour force. In the 1975 population census (and also later in the 1980 and 1985 censuses) a link between the workplace reported by the person on the questionnaire and the establishment entered in the Business Register was made manually in connection with the coding of the questionnaires. In the register-based solution in 1990 this link was formed by means of taxation data.

9. The 1980 population and housing census was still a conventional questionnaire census. Since the 1970s there had been growing need for creating a building and dwelling register for administrative purposes. In connection with the 1980 population and housing census it was decided to collect basic information for setting up a register of buildings and dwellings. This collection was based on a separate act (thus not the Population Census Act) and the collector of information was officially the Population Register Centre. The actual collection was made in connection with the population census. The data formed the basis for the Register of Buildings and Dwellings at the Population Register Centre, where it has since been maintained on the basis of updates from municipal building authorities.

10. In the 1985 population census questionnaires were used only for collecting information on the population's economic activity (e.g. main type of activity, workplace, occupation). Other information (e.g. buildings and dwellings) was produced on register basis. To lower costs, new methods were used in the census for treatment of occupation and workplace information, for example. An automatic coding system based on alphabetical identification was created for coding occupations, and this system has been developed further at each census. The workplace information from the 1980 census was also pre-filled on the 1985 questionnaire and only changed information was processed.

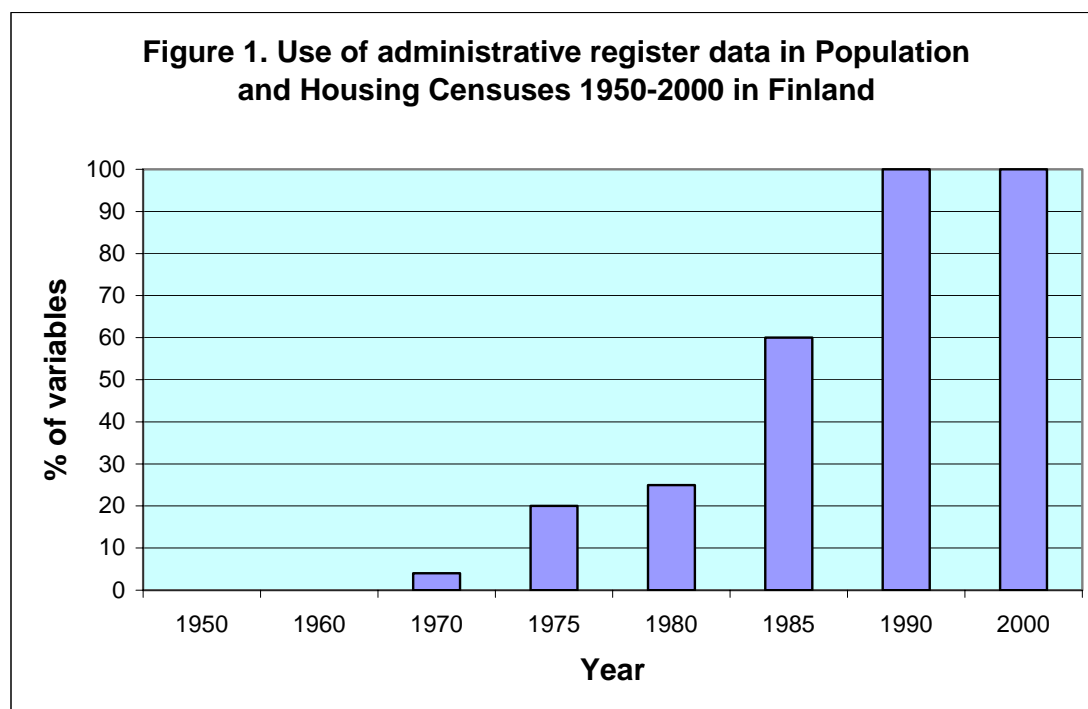
11. After the 1985 population and housing census, it was finally possible to produce register-based data on the population's economic activity. In 1987 statistics describing the population's economic activity and employment were for the first time produced from register sources, thus forming register-based employment statistics. They are based on utilisation of around 30 administrative registers. Most of these registers are pension insurance and personnel data containing information about people's employment relationships. Other key data used are taxation registers, employment authorities' registers, pension institutions' registers and various registers related to studies. Most data are needed for determining the main type of activity for a person. The determination is based on acquiring all the data materials relevant for the person's economic activity that describe his or her activity and by combining and prioritising them the person's main type of activity can be determined (register estimation).

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12. In the register-based employment statistics a link between the persons defined as employed and Statistics Finland's Business Register is formed on the basis of tax authorities' registers. The difficulty here is that the link can be formed with taxation data only to the enterprise where the person is working, not to the establishment. This is not a problem for single-establishment enterprises but it is quite hard to do so in case of multi-establishment enterprises. Statistics Finland tried to persuade tax authorities and employers' organizations to include information describing the establishment in the data supplied to tax authorities. This was not, however, successful, but the solution to this was that Statistics Finland collects yearly information from all multi-establishment enterprises concerning the establishment where those employed by each enterprise are working. This inquiry is made together with the Business Register's inquiry concerning the characteristics of establishments. Compared with the rest of the register-based production system of the employment statistics, this part, which produces around two per cent of the data content of the whole statistics, is very labour consuming.

13. With the help of the above described solutions, which were developed gradually census by census, the 1990 population and housing census could at last be made totally register-based, without any questionnaire collection directed to the whole population. Annual statistical systems were also formed from the census sub-systems. Annual register-based demographic statistics have been produced since 1975, family statistics from 1978, statistics on dwelling and building stock and on housing conditions since 1985 and employment statistics since 1987.

14. The figure below can be used to describe increasing use of the above-mentioned administrative register data census by census.



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II. REASONS FOR ADOPTING THE APPROACH

15. In Finland, as elsewhere in the world, the main reason for searching for new techniques and methods for population censuses has been to lower the costs of censuses. By utilising the data collected for administrative registers whenever possible, it has been possible to reduce the costs of censuses. However, only when the use of the questionnaire inquiry to the whole population was completely abandoned, the census costs dropped dramatically. The last full-scale questionnaire census in 1980 cost in present money EUR 34 million, while the register-based census of 2000 cost EUR 0.8 million.

16. The second major reason for introducing the register solution in Finland was that users of data need information more often than every tenth or fifth year. The register-based solution has made it possible to produce almost all the key census data every year.

17. The third important reason for adopting the register solution is rationalisation and minimisation of the response burden. If the data are already in the register collected for some administrative purpose, it lowers the response burden and it is also rational and cost-efficient to use the already collected data for statistical purposes as well. This is one of the key principles in the Finnish Statistics Act as well; according to the Act statistical authorities should exploit the data in administrative registers whenever possible and they can start new data collections only when the data in question are not available from administrative sources.

III. NECESSARY CONDITIONS FOR IMPLEMENTING THE APPROACH

18. The main conditions for utilisation of administrative registers in compilation of statistics in general are the legislation mentioned above. National legislation must support exploitation of administrative data following the basic principle that administrative data should be used whenever such data are available. On the other hand, the legislation should guarantee statistical authorities' right to obtain the data in question for compilation of statistics. However, this does not rule out the need for close co-operation and good relations between statistical authorities and keepers of administrative data. Support from the government authorities is also vitally important.

19. Existence of administrative register systems is naturally a major requirement. In this sense the most important data are the key basic registers containing unit data (persons, buildings, dwellings) for the population and housing census. It is also essential for efficient utilisation of register data that there are uniform identification systems and that they are used in different register data. A bare minimum requirement is to have a unified identification system for the key basic registers. In some cases it may be possible to link different registers even without unified identification codes, but this is certainly more laborious and time consuming.

20. It is also important for statistical use of administrative registers that the general public accepts the use, for which reason it is crucial to bring into open the benefits of using once collected data for statistical purposes.

IV. LESSONS LEARNT

21. According to Finns' experiences, utilising administrative register data in production of statistics is mainly based on the principle that statistical authorities must content themselves with the data contents, concepts and classifications that administrative authorities need for their activities and then adapt the administrative concepts and classifications suitable for statistical purposes. Administrative authorities are very seldom willing or even able to amend the concepts or classifications better suitable for statistical needs, because the data are meant to serve administrative uses. Statistics Finland's experience is that even though administrative authorities agreed to include collection of some statistical information into administrative data collection, it would be very difficult to safeguard the quality of the data.

22. It is essential for exploitation of administrative data to have continuous, good co-operation between statistical authorities and keepers of register data both on the level of directors general and experts, in order that information concerning changes in legislation or administrative practices could be transmitted as efficiently as possible, so that when necessary, it would be possible to react to it as early as possible. It is also possible to have an effect on the quality of data by giving feedback to register keepers. An important principle in giving feedback is that of unidirectional exchange of information: information is passed from register keepers to statistical authorities, not vice versa. This means that any errors or incongruities emerging on the basis of register combinations, for example, can be reported to register keepers only on a general level, not as individual cases.

23. One must also be prepared for that when legislation changes, some items of data may be deleted from the data content of administrative registers and then new solutions must be devised in their place. This was the case in Finland for acquisition of occupation information when after the introduction of the tax proposal procedure, tax authorities no longer needed occupations for taxation and thus that information was no longer collected from taxpayers. Statistics Finland had to develop a new, substitutive production system for occupation information where some of the information (occupation titles of those employed by unorganised employers) is collected from employers. The majority of the information still comes from administrative records. Statistics Finland has also created a statistical register of occupations, by means of which occupation information is produced yearly from 2004 onwards.

V. ESSENTIAL FEATURES OF A CENSUS

24. When developing population census solutions in different countries it has been discussed whether these solutions fulfill the essential features of the UN population census recommendations: individual enumeration, simultaneity, universality, small-area data, defined periodicity. The Finnish register-based population and housing census solution conforms perfectly to these features. It produces unit-level data on all census units (persons, families, household-dwelling units, buildings, dwellings) whose reference period is the end of the year, or in some cases the whole year (e.g. annual income). It also supplies very accurate small-area data, because the system is based on map co-ordinates (each person, building, dwelling and workplace are provided with map co-ordinates) and it thus enables production of data even regardless of

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administrative boundaries on any area at all. It also produces the key census data yearly and more extensive census data at least every five years.

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