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Topic II: Impact of technical measures and standards on data quality

QUALITY ISSUES IN THE ISRAELI CENTRAL BUREAU OF STATISTICS

Supporting paper

Submitted by the Israeli Central Bureau of Statistics (ICBS)¹

Abstract: Quality in the statistical process is composed of different factors. One of the factors influencing the quality of data is the quality of the work process from the information technology aspect. Since 2001, the importance of this area has come to light and many quality activities in the ICBS were initiated. The different quality assurance activities the ICBS is carrying out include the establishment of a Software Quality Assurance unit (Work procedures, standards, Tests, Documentation, Configuration management, risk management); information sharing activities; different methods of computerized data collection and data confidentiality measures. All of these activities are ongoing processes and we must tackle the implementation problems that such processes generate.

I. INTRODUCTION

1. Quality of statistical data is essential to information-based organizations. In discussions between statistical offices and other information organizations, emphasis is frequently put on the quality of data from the aspect of the statistical analysis of the gathered information. The methodology of data analysis is of course, of great importance. But, data analysis is not the only factor influencing the quality of published data.
2. One of the factors influencing data quality is the methodology of gathering and processing the information. Today, in the Israeli Central Bureau of Statistics most data is gathered by computerized methods. These methods include either gathering data files from information sources such as other government offices, or gathering information in the field and inputting it into the computerized database system (by data entry, OCR or other methods drawn from the wide range of inputting possibilities). The different methods of gathering data include many work processes. The quality of these processes is essential.
3. Another factor influencing the statistical product quality are the tools and applications used to support the gathering, processing and analyzing activities that make up the statistical process.

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4. The computerized side of the work process is handled differently in different organizations. The ICBS has a well-developed Information Technology Department. This is due to the Israeli Central Bureau of Statistics' policy in which all tools and applications that are not off the shelf products are developed in-house. The organization currently uses over 150 such applications. In addition there are numerous tools and generators. The total number of employees in the ICBS is about 800, 10% of which work for the IT department.

II. RAISING AWARENESS

5. As was stated in the introduction, much of the software used in the ICBS is developed in-house. Despite the intensive software development carried out in the IT department, until the year 2000 not much emphasis was put on software quality assurance methodology. The need for constant inspection and control of the applications and tool development and maintenance increased in 2000 in the Information Technology Department and has started to be carried out in 2001.

6. This awareness began with the rise in the use of technologically advanced, and complex integrated computerized tools, and following cumulative experiences of implementation of new systems and technologies within the organization's workflow.

7. In 2001 a Software Quality Assurance unit was established. The Unit's responsibilities include all aspects of quality assurance within the IT departments including – procedures, documentation, configuration management, risk analysis and management, software testing, standards and indexes, evaluation of new products to be purchased.

8. The progress in the different issues will be listed in the next section. It must be noted that all progress of the above has been made in spite of the fact, that at present only one employee of the organization is dedicated to software quality assurance issues.

9. In order to continue and develop the software quality assurance in the Israel Central Bureau of Statistics there is an urgent need to establish a permanent team of a number of employees dedicated to the subject.

III. ACTIVITIES IN THE ICBS IT DEPARTEMENT FOR THE ASSURANCE OF QUALITY

A. Activities which the QA unit is directly responsible for:

10. The development of an intranet procedures site in which all documents and procedures relevant to quality assurance are published includes procedures, templates, and other quality-related documents. All IT department employees have access to this site and can download any document or template that is needed.

11. The development and implementation of work procedures for the IT Department includes gathering and updating existing procedures in addition to development of new procedures and standards for the work methodology in the IT department. An easy access to these procedures by the IT department employees is given through the intranet procedures site.

12. For the inspection of the documentation in the software development process and maintenance, templates for the different documents that are mandatory in the software development process (requirements, detailed design etc.) were prepared and published on the intranet. In this way we help developers and system analysts in their duties and in addition manage to standardize the departmental documentation.

13. Configuration management – version management, files and documents is in its initial stages. The IT department today is executing preliminary actions in the areas of documentation and file management and knowledge sharing

14. The Unit is also responsible for risk analysis of development projects for a better assessment of their expedience and of the obstacles expected during the development process. In the future, we hope to implement a tool which will able us to manage and control the different risk factors in a development project.

15. The development of a software testing team (QC) is one of the most important roles of a QA unit in an IT department. In this team new applications are tested, either manually or by automated testing tools. The testing process is executed parallel to the development process. In this way the project can proceed from stage to stage in the easiest way possible. Today, the testing process is only partial and focuses mainly on the documentation and usability tests in critical systems. The testing process enables the developer to move the application into the production stage with a minimal amount of bugs and problems. The continuance of the testing process is delayed at present, due to budget limitations, and is expected to take place in the very near future.

16. The setting of standards and indexes for the measurement of product quality includes regular inspections and the preparation and implementation of client satisfaction polls. The importance of these indexes and standards is mainly because of the status of the department as a service department and the need for constant measurements as to our performance and response to our clients.

17. Inspection of shelf products to be purchased is also the responsibility of the Unit. Before the purchase of shelf products there is a need to check for compatibility of the product for the organization, on the user level and for the system level. This includes both in the stability and integrity aspect, as well as the prospect of successfully introducing them into the organization as well as the length of time needed for training the users.

B. Activities in the ICBS that will enhance the sharing of information and efficiency of the work:

18. The ICBS has two working networks. The main is an internal network that is that is completely detached from the outside world or the Internet. This is the main working network and in it an intranet is being developed. Most of the sharing of information and activities is done in this network. The second network is the external network that is connected to the Internet. This network is mainly for contact with the outside world such as e-mail, the ICBS Internet site etc. this network is limited in the services it gives to its users. Because of data confidentiality there is a need for the users to use the internal network. The following services are all given in the internal network only:

19. Announcements relevant to all or many employees or in areas of interest published on the intranet, and appear with every booting of the computers connected to the internal web.

20. A data warehouse for data in all subjects treated by the Central Bureau of Statistics will be developed. The data warehouse will enhance the sharing of data between the statistical units in the ICBS. This will promote the quality of the statistical process by enabling the users to drill down within data and across of data that until now sat in separate databases and was not available to the different units.

21. A ZENworks application launcher (version 3.2.1) has been set up directly from the Novell internal network. The launcher provides easy access to frequently used network based applications.

22. The development of an organization portal within the intranet is in progress and scheduled to air at the beginning of 2003, it will include several tools and information centers.

23. A file management system that will be accessible from the portal will include all files that may be of common interest to more than a single person. This system facilitates the sharing of common documents. For instance – a document that has to be approved be a number of people will be saved in a common folder and can be revised be all users permitted.

24. A Help Desk will be available in the portal and all users will be able to report software and hardware problems independently. Until the airing of the portal, all problems are reported to the helpdesk by phone. The new system will enable the users to report problems and in addition to check the status of their previous complaints.

25. An internal e-mail instant messenger service will be set up.

26. A Microsoft Exchange server will be introduced for the management of a joint diary.

C. Activities in the ICBS that will ensure the accuracy of data entry from surveys:

27. One of the most important functions of the ICBS is the collection of data through surveys. Up to the beginning of the 1990's all survey data was collected by surveyors who filled out paper questionnaires. Later the data was typed into the computer from the paper questionnaire. This work process left a large part of the stages without an option for quality control in addition to the possibility of entering errors by the typist.

28. Since the beginning of the nineties some of the survey data collection is done via the phone and the surveyor that is sitting in a collection center types the data directly in to the computer. The direct input saves one stage of error entering and inserts logical testing during the interview – this way a large percent of the errors is identified.

29. The rest of the surveys have continued to be done by means of paper questionnaires until the beginning of the current century. There has been much work done to move this data collection to direct input into laptop computers in the field. This transfer, to the Blaise collection application was difficult because of the language barrier. Hebrew and Arabic are written from right to left while the European languages are written from left to right. Until the present we are still struggling with these problems although much progress has been made.

30. In 2000 a strategic decision was made to centralize all data collection in a Data Collection Center, situated in the main CBS building in Jerusalem without the need for local offices. This allows better control and overview of the data collection processes (worker and systems) in all methods and surveys. At the beginning of 2001 the change was made in the collection method. A large part of the data collecting process from surveys and other data collecting projects is changed to a collection method in which the data is entered directly to a laptop computer by the surveyor and from it via telecommunication directly to the central databases. This transfer is communicated directly to a Data Collection Center, situated in the main CBS building in Jerusalem without the need for local offices. This process was developed jointly by the IT and survey departments of the Israeli Central Bureau of Statistics and it uses the Blaise system. This method allows logical tests during the interview in the field in addition to elimination another source of error by typing in the paper questionnaires.

D. Activities in the ICBS that will assure the quality of data confidentiality:

31. In 2000 a process of evaluating automatic tools for assurance of confidentiality in data published or transferred to third parties outside the organization (mainly academic) was undertaken. The intention is to implement automatic tools to assure this subject in the near future.

32. Since 1998 a confidentiality committee has been active within the Central Bureau of Statistics, its main function being to examine the data for publication and to prevent publishing data that might hurt confidentiality.

33. Since 2001 there is an ongoing evaluation project of the software Argus, a software application dedicated to testing the confidentiality of data – both tables and micro data. The evaluation of the software is done in cooperation with the Netherlands Central Bureau of Statistics and the TES Institute. The evaluation is testing the stability and reliability of the software in addition to deciding its compatibility with the Israeli

Central Bureau of Statistics needs. This evaluation is done by the IT Department, in cooperation with the confidentiality committee

IV. CONCLUSIONS

34. All the activities listed above represent different aspects of data quality in which the IT department can contribute. All of the activities are on-going processes whose implementation will be long and difficult.

35. The success of these actions cannot be measured in the short term, it must be tested in the long term and after the full implementation of many of these actions. This brings to light the very problematic issue of presentation and development of the quality issue to the higher management levels. Investments have to be made in the short term but the results will only become apparent in the long run. The implementation of many of the above-mentioned issues is not easy and a strong support of the ICBS management is vital to its success. We are in the beginning of the process and it seems we are on the right track.

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