

Comment

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R. Platek and C-E. Särndal are to be congratulated for their interesting article on the quality of statistics, particularly of surveys, and the central role played by statisticians in the production process and quality improvement, topics of the utmost strategic importance for modern statistical agencies.

Over the past decades, the globalisation of economies and technological breakthroughs in the domains of information and communications have created favourable conditions for providing a vast mass of information, without limitations of time or space.

Nowadays, the information society is part of our social fabric and constitutes the driving force behind development. The new factor of wealth is knowledge, which must be stored, processed and developed. Statistical information is a necessary form of knowledge for gaining full citizenship and essential to decision making. Statistics is a public asset, with an enormous range of uses for millions of people, even those located in the remotest places, throughout the world.

Since many more people have access to information as well as an enhanced ability to interpret, analyse and criticise, what is of course required is more and better information. Thus, statistical systems are confronted with a growing number of requests despite their limited resources. It then becomes necessary to establish priorities, in close collaboration with the media available, with the central issue being the quality of statistical data.

Although there are many definitions, Quality is a technical concept referred to in the ISO family of standards and therefore applied on a worldwide scale, defined as “The totality of features and characteristics of a product that bears on its ability to satisfy stated and implied needs of customers” (ISO 8402).

It is the customer who must define and evaluate the quality of products and services. Quality is subjective and multifaceted since it deals with perceptions and it is up to each customer to have his/her own definition of quality. It is the implicit value for the customer that determines quality and this value may even vary between customers and over time. Thus, the needs and requirements of customers must be clearly understood and their degree of satisfaction measured, analysed and improved.

The concern about Quality is not a recent development in statistical agencies. What is recent is its systematic, organised and professional method as a management function, enabling the promotion of a culture of quality while focusing on the customer.

By adhering to the principles of Total Quality Management, statistical agencies adopt management models aiming at achieving excellence. It is thus a new way of managing the activities of organisations, improving the efficiency and effectiveness of processes

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in order to meet the needs and expectations of customers, collaborators, suppliers and society in general, guaranteeing the success of organisations in the long term.

The authors adopt a very comprehensive concept of the statistician, including different occupational categories under the same label. What underlies this approach is the importance of working in a multi-disciplinary team, taking into account the fact that the statistical production process integrates a number of phases requiring distinct specialisations and competencies.

While agreeing with the description of the functions presented by the authors, it should be noted however that, particularly in statistical agencies with limited human resources, the same person could accumulate functions inherent in various categories such as subject matter specialist and survey manager.

Some statistical agencies which apply the principles of total quality management, also have statisticians who are frequently referred to as quality facilitators, specially trained in quality methodologies and tools and whose function is to provide technical support and revitalise or collaborate with quality teams (if any) in actions aimed at the continuous improvement of quality.

In the statistical production process, project teams also comprise other professionals who handle data at any point of the process, at the operational level, and who may originate errors that are difficult to measure.

In total quality management, all collaborators should assume their share of responsibility for process management; each one should understand that he or she is responsible for quality at their work post and that they have an important contribution to make towards the common work and the success of the results. All workers and their initiatives are important, at every level, and have a contribution to make towards improving quality.

It is essential, albeit difficult at times, to establish effective communication between the workers involved in the process, in every direction: bottom up, top down and horizontal. Statisticians have a responsibility to justify and explain methods, processes and results to users, as is stated in the article, but they may also and indeed ought to do much more than this.

Statisticians must develop a relationship of trust with users, capable of strengthening interfaces; they must have a pro-active attitude towards the needs of users, anticipating them in relation to their expectations and not only reacting to their requests "after the fact."

As professionals who are centres of expertise, statisticians must orient and guide users, explaining to them the reasons for a series break, for the inconsistencies of the information on a specific topic but derived from different sources: in short, statisticians must have an instructive and educational approach towards users, thus making products more interesting and easier to interpret.

Some users may be unable to analyse and interpret statistics and recognise their limits and gaps. The methods to help users to understand these situations vary, based on the different types of users.

Professional users need to know all the statistical metadata describing different aspects of statistical data: concepts and definitions, populations, variables, classifications, accuracy aspects and also availability aspects. Occasional users do not require such detailed metadata.

Considering that we have to educate and motivate our future users, INE (National Statistical Institute) in Portugal has developed the ALEA project (Local Action in Applied Statistics), which falls within the context of promoting statistical literacy, using the new advantages of collaborative teaching strengthened by the Internet and designed primarily for secondary school students. Its objective is to contribute to creating a space where students and teachers participate together to gather information on everyday problems conducive to statistical analysis in order to arouse the interest of younger generations in statistics.

The Statistical Office of the European Communities (EUROSTAT) identified seven characteristics defining the quality of statistical information: relevance of statistical concepts, accuracy of estimates, timeliness and punctuality in disseminating results, accessibility and clarity of the information, comparability of statistics, coherence and completeness. Clearly, there is a strong link between the quality of statistics and the resources available to produce them. An assessment of costs should be kept in mind during the quality evaluation process. These attributes concern not only the statistical product but also the services rendered.

The quality of statistics is a multifaceted concept and as such it is necessary to find a trade-off between some of the attributes. Users evaluate differently the various characteristics of quality, and sometimes the predominance of some can conflict with others. Such is the case, for example, of accuracy and timeliness, where the production of timely information makes it necessary to use sources with lower degrees of reliability and determines the need for subsequent revisions, which, to a certain extent, can cause a lack of credibility of the information provided.

In a traditional approach, data quality meant the accuracy of the data. More recently, it has become necessary to define the critical characteristics that a product should possess so that it can be considered as having quality, which can only be determined by the needs and expectations of the users.

On the other hand, the quality of the product can be assumed to be a function of the efficiency of the production process and, for which reason efforts ought to be focused on improving the process. If errors in the various phases of the process are properly controlled or if the process does not have any errors, then the product will have quality.

We agree that the progress in information technology has revolutionised the survey processes, facilitating and accelerating the data collection and other production process phases such as estimation, tabulation and dissemination. But it is difficult to agree when it comes to saying that it is not obvious that these improvements have an effect on the overall quality of data. This statement assumes that data quality means data accuracy and we know that quality has other characteristics such as accessibility and timeliness ensuring enormous benefits for the user, in terms of quality. Text, sound and image are sent over an electronic network at a speed which only a few years ago was unimaginable and the adoption of new architectures based on data warehouses has made production and dissemination of information as flexible as customers wish. Is this not customer-oriented quality?

One of the critical concepts of total quality management is the systematic management of processes. In order that organisations may function effectively, they must manage a large number of processes interacting with other processes. Thus, the output of a certain

process may be the input to another process, establishing a relationship of internal users. It is possible to ensure the quality of the product by continuously improving the process performance, through the implementation of data based process management systems.

It is therefore necessary to correctly identify the core processes of the organisation, those processes which have a direct effect on the needs and expectations of customers, and to describe its various phases through standardised procedures, which involves nothing more than a precise description of the activities which supply the procedures and the best method to develop them and constantly improve them. These procedures may be compiled and documented in Manuals, the Procedure Manuals, applicable to such areas as production and dissemination. At INE-Portugal, these standardised procedures are mandatory and widely disseminated to all employees working in the processes so that they are properly understood and used. It is thus possible to reduce variation in process performance.

At INE-Portugal, a team of internal quality auditors was formed and trained, made up of statisticians who, in addition to their usual duties, examine whether the documented procedures are being properly applied, whether there are any nonconformances to requirements, and recommend corrective actions. Another objective of the audits is to verify whether the procedures need to be revised and/or updated. In order to carry out these actions, documentation and quality records are required, which are frequently dispersed in statistical agencies, since the file system is often not well organised.

All statistical agencies must appoint people to take charge of their critical processes, establish performance criteria for products and services and maintain an up-to-date description of all the processes. In order to gain a better knowledge of the processes, quality tools are used, such as flowcharts, Pareto diagrams and fishbone (Ishikawa) diagrams, with the help of the working teams.

The key process variables must also be identified and measured through data or diagrams, in which the problems affecting the desired result are duly identified and measured. These measures are essential for continuously improving the processes.

The standard quality reports on statistics that EUROSTAT is implementing together with statistical agencies of the Member States make it possible to evaluate certain errors during the various steps of the process insofar as they assess the quality of the statistical products for the various attributes with which they are associated, in accordance with the definition of the quality of statistics. Higher quality indicators may mean that a process has been defined and implemented with greater efficiency.

After setting an objective for a certain survey, in close collaboration with users, a production process is developed integrating various phases, from the design, which must be oriented by criteria of accuracy and objectivity, and including the planning, collection and processing of information to its analysis and dissemination.

Surveys are conducted in order to collect information on a specific population and the statistics resulting therefrom are estimates of unknown parameters of that population. The statistical error is defined as a deviation between observed/estimated values and true values of variables. All surveys are affected by errors which may be sampling or non-sampling errors. Sampling errors depend on the sample design and sample size. Nonsampling errors may be broken-down into coverage errors, measurement errors, processing errors, nonresponse errors and model assumption errors.

The statistical error rate, as well as the totality of product defect rates are indicators related to customers' satisfaction and to the relationship established between them and the organisations. The objective is to achieve the lowest possible error rate. In order to do this, it is necessary to identify the errors and evaluate them. The entire process must be oriented towards minimising errors and making them known, to the greatest possible extent. We return to the idea discussed previously: if the processes are stable, they will generate fewer errors.

The sources of error are extremely diverse and are associated with the collection methods, the instruments, the interviewer, the respondent, the coder. The objective is to control and reduce errors so that the data is quality data. In order to achieve this, it is necessary to carefully analyse the sources of error, ascertain what the source of the problem is and develop the necessary measurement tools. We agree with the authors when they assert that certain errors, such as sampling errors, are easy to measure while others are much more difficult to quantify.

We all know a number of strategies used by the statistical agencies to increase response rates; modernise collection methods by resorting to new technologies; provide interviewers with greater motivation and better training; improve the design of questionnaires, making them more attractive and easier to respond to; improve editing methods, the coding operation, data capture, survey processing – in short, a number of initiatives aimed at preventing or reducing errors throughout the production cycle, more difficult to measure, in terms of the final implications for the total survey error (mean squared error-MSE) which determines the accuracy of the estimates.

Most users (and we exclude highly specialised users such as researchers) seek information that is accessible and timely and trust “official statistics,” and are not very demanding about detailed information on all types of errors related to statistical operations.

The prestige of statistical agencies is very difficult to create and very easy to destroy. Agencies must be able to ensure that statistical information is quality information, exempt from any influences or external pressures, whatever their origin, and that manipulation or distortion of the data is impossible. This guarantee contributes to increasing the trust that users must have in statistical agencies. Therefore, every effort made to continuously improve quality such as quality policies, quality charts, quality labels or declarations on statistical products, and quality indicators, must be widely disseminated.

We agree with the authors when they say that monitoring customer satisfaction leaves out the accuracy of results. But accuracy is only one of the dimensions of the quality of statistical data, and in statistical agencies adopting the concepts of Total Quality Management, whose activities are customer oriented, it is essential to have a better idea of the perceptions of customers in relation to the products and services provided, measure their degree of satisfaction and monitor relations with customers in order to be able to optimise products and services. Thus, user satisfaction surveys provide information on their image, customer segmentation, the principal causes of dissatisfaction, the identification of missing data, and enable a series of recommendations on the dissemination policy of statistical agencies and the development of an action plan to improve products and services, in order to better respond to the needs and expectations of users.

Two areas of activity are mentioned by the authors as examples of vitality in statistical agencies: both index and national accounts theory and practice. They are in fact good examples but another one ought to be added: the research area of statistical agencies and the conduct of studies based on the body of information produced which frequently are sources of prestige and credibility for the institutions. National Accounts, studies and research projects act as “internal users” of the information produced and may make an important contribution in terms of improving quality when, while using the information, they analyse its transverse and longitudinal coherence, the methods of imputation, and problems of overall consistency of information originating from various sources.

Recent developments in survey methodology point towards a new approach to errors and their treatment. Sampling errors have been widely studied in survey research over the years and extensive theories exist concerning their treatment. They are measured as a routine task and form an integral part of the metadata in many statistical agencies.

But the situation differs considerably regarding nonsampling errors. The complexity of many surveys, the vast number of sources of these errors and the fact that the interveners are people (respondents, interviewers, and coders who perform tasks) makes it more difficult to measure errors and their effect on the total error, which is a function of sampling and nonsampling errors. On the other hand, there are costs for defining and collecting data for survey error measurement, and budgets of statistical agencies are more and more limited.

So we fully agree with the conclusion that “it seems unrealizable to have a functional survey model, one that would account for the major errors and yield estimates of the various components.”

Nowadays some statistical agencies are shifting from error measurement to survey quality. Interest is gradually shifting from the systematic measurement and correcting of errors *a posteriori* (corrective actions) to implementing measures aimed at reducing or eliminating the sources of potential errors and preventing their occurrence (preventive actions), which is achieved through quality management of the surveys – streamlining and standardizing processes, working in teams, introducing process improvements.

In conclusion, it should be noted that this is not an easy subject, in view of the rapid development of modern society and its needs. However, there are a number of concerns common to the various modern-day statisticians. The concept of the quality of statistical data has changed, the importance of customer satisfaction is the main concern, and process management becomes vital to achieve the increasingly higher levels of quality demanded by a society in which the value of information affects all decisions.

The statistician must discover new paths, respond to new challenges. Success is linked to innovation and imagination, which are increasingly necessary in view of this permanent change taking place in statistical agencies and their environment.

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