

Quality reporting: The Introduction of Quality Input Papers in a National Federal Statistical System

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Quality reporting is one of the central elements of quality management in official statistics. On the European level the structures and contents of quality and metadata reporting are well defined and standardised. User-oriented quality reports on the one side and producer-oriented quality reports on the other side are covered by the Single Integrated Metadata Structure (SIMS). On the national level similar solutions have to be elaborated. For user-oriented quality reports the transfer is rather simple because one can expect similar user demands at European and national level. But the exchange of information on quality between producers of official statistics has to be defined according to the specific national systems of official statistics, which are quite different between EU Member States.

Destatis and the State Statistical Institutes have commonly developed the concept of Quality Input Papers for the exchange of quality information in parallel to the exchange of data. The paper describes the general idea and the goals of the concept as well as its generic nature. Part A deals with the concept of Quality Input Papers. The framework for this concept is the general concept of quality management in the federal statistical system of Germany which is described shortly in chapter 1. Based on this, the general idea with the objectives and the methodological approach for Quality Input Papers are explained in chapter 2. Part B specifies the procedures and the intended application. The content of the Quality Input Papers and the implementation strategy including the technical support are described in chapter 3. Chapter 4 show first experiences in pilot projects as well as consideration of costs and benefits regarding the implementation.

PART A: Framework and theoretical concept

1. Quality management in the federal statistical system of Germany

Federal statistics in Germany are basically produced conjointly by the 14 statistical offices of the Länder and the Federal Statistical Office. This working association is referred to as “the system of statistical offices” of the Federation and the Länder and the term regional decentralisation describes the underlying principle. Accordingly, the statistical offices of the Länder are generally responsible for conducting statistical surveys prescribed by law.

In this setup the statistical offices of the Länder are usually responsible for collecting and processing data. Therefore, the core processes of statistics production are performed at the statistical offices of the Länder for about two thirds of the federal statistics. The Federal Statistical Office is in charge of compiling and disseminating federal results. Compiling federal results specifically includes the validation of the provided results and the aggregation to results on the federal level. In this respect the situation in Germany is quite similar to the situation of the ESS.

In Germany, quality has a long tradition in statistical offices. The principles of objectivity, neutrality, and scientific independence to which statistical offices in Germany are committed to are laid down in the federal statistical law of Germany since 1987. Additionally, the system of official statistics in Germany has its own quality guidelines and standards. In 2003 the Quality Standards in German Official Statistics have been published describing the common quality policy of the statistical offices, the methods applied and the standards to be used. This version was revised in 2006 after the endorsement of the ESS Code of Practice which (together with the quality preamble) was integrated as an annex¹. As a matter of course, the quality policy of German official statistics is influenced by the European development on quality.

In 2009, the statistical offices developed the concept of coordinated quality assurance. The concept aims at ensuring and permanently improving the quality of statistical processes and products. It lays emphasis on four main aspects:

- Systematic consultation of users
- Monitoring of the quality of processes and products
- Consistent (standardized) and appropriate methods

¹ Quality Standards in German Official Statistics, Statistical Offices of the Federation and the Länder, first published in 2003 (in English 2005), current version from 2006.

- Reduction of response burden.

For each of the main aspects methods and approaches have been elaborated (either existing ones or new ones). The considerations on monitoring the quality of processes and products were based to a large extent on principle 4 of the Code of Practice. While on the European level quality reports have been defined to be sent from the national statistical data producers to Eurostat, such an approach did not exist in the federal statistical system. The development of a corresponding instrument for national purposes in order to support national quality reporting as well as to support permanent improvement has been defined as a (strategic) goal of German federal statistics. Already at that stage, the integration of quantitative data (indicators) has been identified as an important element.

2. Theoretical concept for Quality Input Papers

Generally, the Quality Input Papers are regarded as a kind of producer-oriented quality reports. They are to be exchanged between the statistical offices in parallel to the exchange of statistical data as part of the cooperation in producing federal (and European) statistics. In that respect, the focus is set on the documentation of quality aspects of relevant parts of the statistical processes. According to the responsibilities of the statistical offices these relevant processes are data collection and data processing.

Three main objectives have been regarded as most important for the use of Quality Input Papers:

- They should provide the information basis for national quality reports (especially for process oriented indicators on accuracy).
- They should contribute to the identification of good practices in statistical offices.
- They should serve the fulfilment of national and European quality guidelines and standards, namely the national quality standards and the ESS Code of Practice.

The concept has been developed by a working group of quality experts of the statistical offices in Germany. Existing documentation instruments have been consulted as a starting point. Those internal documentations existed in single state statistical offices and in a joint programme on benchmarking between state statistical offices.

The scope of Quality Input Papers is derived from their objectives. They should be applied for all statistical domains which are based on micro data and should be focussed on the processes of data collection and processing. An application for accounting systems seemed not to be useful. Aiming at

such a wide scope it is quite clear that the content has to be generic and to give room for domain specific adjustments.

Considering the reporting frequency the general idea aims at a parallel transmission of statistical data and Quality Input Papers. This general idea has been modified in two respects. On the one side it is clear, that some characteristics of the data collection and processing are quite stable and could be reported on at a lesser frequency. On the other side, the sometimes critical transmission of statistical results should not be endangered by the obligation of simultaneous transmission of metadata.

In order to limit the generic content of the Quality Input Papers the approach of focusing on key aspects of the relevant processes has been chosen. At the same time the importance to support the calculation of the ESS Quality and Performance Indicators has been stressed. This led to the selection of those quality indicators as key aspects, which are difficult to calculate with existing means, namely:

- Over-coverage rate (A2)
- Common units proportion (A3)
- Unit non-response rate (A4)
- Item non-response rate (A5)
- Imputation rate (A7)

These aspects were extended by adding indicators on under-coverage and plausibility, which are closely related to over-coverage, item non-response and imputations. Additionally, the most important upstream and downstream process steps have been included to better understand causes and effects.

The following table gives an overview about the selected key aspects, upstream processes and downstream processes:

Key aspects	Upstream processes	Downstream processes
Over-coverage, under-coverage	Updating the survey frame Measures to improve the quality of the survey frame	Treatment of over- and under-coverage
Common units	Similar to over- and under-coverage	Similar to over- and under-coverage
Unit non-response	Preparation of data collection Way of data collection Reminder mechanism, return control	Treatment of late responses, corrections Imputations
Item non-response, plausibility checks	Data entry	Imputations Macro-plausibility checks
Imputations	Non-response Plausibility checks	Analysis of preliminary results

PART B: Procedure and application

3. Structure of the Quality Input Papers (QIP)

Following the theoretical consideration, the QIP basically consist of two parts, the master data sheet and the production data sheet. The master data sheet contains basic (and time stable) information about the respective survey, e.g. about priorities when treating errors and about the timing of reminders sent. It is to be filled in only once every three years. Therefore, the effort required is low. The production data sheet contains mostly numerical values which vary with every survey cycle (e.g. number of non-respondents and number of errors detected). So, the effort to complete it is much higher compared with the effort for the production data sheet which is to be provided with each survey cycle.

The concept of QIP is generic. It serves as a general orientation in order to be applicable for all statistics based on micro data. However, each statistic will have to use the general QIP and produce a statistic-specific adaptation that incorporates its specific circumstances.

4. Standardized procedures and strategy for IT support for QIP

For the introduction of the QIP it is necessary to develop standardized methods. Both the standardization of information that are necessary for calculating the ESS Quality and Performance Indicators as well as the standardization of production processes are prerequisites for standardized IT support. Survey-specific information can only be determined using survey-specific IT tools, thus increasing the implementation cost and effort of QIP.

The strategy for IT support means that standardized IT tools are available for the application of the QIP. These are, for example, data entry systems, statistical data editing systems and interfaces to other IT systems. The IT tools must support the transfer of data between the Federal Statistical Office and the statistical offices of the Länder.

Appropriate IT tools for summarizing and evaluating the information transmitted in order to gain a comprehensive insight into important quality measures need to be developed as well. These tools should ideally be available for all responsible members of staff in the whole system of German official statistics.

5. Test and implementation of the QIP

To prepare an implementation to a wide range of surveys, a pilot test was carried out in the domain of finance statistics. The pilot project "QIP in finance statistics" should reveal the effort involved in customizing and creating the survey-specific QIP. The test covered four survey periods. The test results showed that the QIP are suitable for the determination of quality indicators and surrounding quality information in general. However, the manual effort for collecting and filling in the required information is not acceptable. The pilot project also resulted in a number of improvements to the generic draft of the QIP.

Based on the results of the pilot project a concrete implementation concept for QIP in finance statistics has been developed including a strategy on how to provide the IT support necessary to fill in and transmit the QIP in an efficient manner.

The wider introduction of the QIP to other statistics must be conducted in a gradual manner. The objective is the acquisition of quality indicators on accuracy to be published in national and European quality reports. The programming and implementation of appropriate IT tools for

automated calculation of quality indicators are possible but need to be realized in close collaboration with the IT departments.

It should be noted that an adequate communication strategy concerning the benefits of QIP is as important as a suitable tool itself. Ideally, subject matter statisticians do not need to be forced into transmitting the required information by a quality management policy but recognise the benefits themselves.