

# ESS Standard Quality Reporting Implementation: the Point of View of a National Statistical Institute

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## **Abstract**

Importance of quality reporting has always been acknowledged in the European Statistical System (ESS). Most European regulations include requirements on quality information to be provided. However, content and level of detail of required information are extremely different from one regulation to another one.

The ES Code of Practice (CoP) and the Regulation n. 223/2009 fostered harmonisation of quality reports (QRs) in the ESS and promoted their dissemination to users.

Cross-domain harmonisation is desirable for several reasons, e.g. to obtain an acceptable minimum level of documentation for all European Statistics, to improve comparability, to provide users with clear and structured reference metadata.

However, harmonisation of ESS QRs implies several steps to be performed: the definition of conceptual standards and their promotion among domains, the development of technical tools to support implementation, a strong coordination of implementation in statistical domains.

Over the last years great efforts have been spent to improve standard quality reporting at ESS level. Istat has been particularly involved in these initiatives with Eurostat and other NSIs. The paper presents an overview on the activities already performed and on some further planned initiatives.

Efforts at ESS level can not be sufficient. Similar efforts should be spent at national level. Obviously, the actions to be performed can differ from NSI to NSI considering the existing background. The paper focuses on the Istat experience on quality reporting: what already done - mainly software enhancements - and what still to be performed to improve coordination among domains. Finally, a review of how QRs are disseminated by NSIs will be reported, as a basis to define how to proceed at Istat. Indeed, national dissemination of ESS QRs is foreseen for 2016 as an improvement action deriving from the recommendation of the 2013-2015 CoP Peer review reports.

**Keywords:** quality reporting

## **1. Introduction**

Traditionally, European Regulations on the production of statistics included some requirements on quality information that should accompany the data transmission from National Statistical Institutes (NSIs) to Eurostat. Such requirements were very heterogeneous for different domains, not only for the amount and level of detail of the required information, but also for the adoption of different definitions for the same concepts or different formulas for the same indicators. In practice, cross-domain comparability was not taken into account. Also the format used for quality reports' transmission was not standardized, varying from Word to Excel files sent mainly by email. Quality reports were generally prepared for monitoring and assessment purposes; they were producer-oriented and generally managed internally to Eurostat and the domain specific working groups.

With the adoption of the ES Code of Practice in 2005 and the introduction of Regulation n. 223/2009, quality reporting gained relevance in the European Statistical System (ESS). Cross-domain harmonization was fostered and the increasing need for transparency promoted the external dissemination and the definition and implementation of more user-oriented templates.

Under this commitment, several activities have been carried out by Eurostat in collaboration with NSIs to standardize and improve quality reports, and other actions are planned. In the next section a brief overview of such activities is reported. The production of national quality reports is coordinated by Eurostat but is carried out by NSIs. Also at national level efforts are needed for the improvement, harmonization and dissemination of quality reporting. Section 3 describes the Istat experience for the implementation and coordination of quality reporting following ESS standard, while section 4 presents the Istat ongoing work on national dissemination of such reports. In section 5 some concluding remarks can be found.

## **2. The process of harmonization of quality reporting at European level**

The work on the definition of European standards for quality reporting began several years ago. Documents like “How to make a quality report” and “Standard quality reports” produced in the framework of the European Working Group “Assessment of Quality in Statistics” are

dated 2003 (Eurostat, 2003a and Eurostat 2003b). A first set of “Standard quality indicators” was proposed by the European “Task force on quality indicators” in 2005 (Eurostat, 2005). However, such documentation was only made available as methodological support for who should (or would) compile a quality report, without being mandatory or part of a quality reporting implementation strategy.

The situation started to change with the adoption of SDMX (Statistical Data and Metadata eXchange) as a technical standard for metadata transmission. It promoted the introduction of a standard template for reference metadata to be exchanged in the ESS. In 2009 the Euro SDMX Metadata Structure (ESMS) was defined and its use recommended in the Commission Recommendation of 23 June 2009 on reference metadata for the ESS. Eurostat then started to implement ESMS for the documentation of its processes and to disseminate the filled-in reports. In the same year the first version of the “ESS Handbook for quality reports” (Eurostat, 2009) was released while in 2010 the Eurostat “Expert Group on Quality Indicators” defined the set of ESS Quality and Performance indicators (ESS QPIs; Eurostat, 2014c). In 2010 Eurostat developed the ESS Standard for Quality Report Structure (ESQRS) trying to integrate the ESS QPIs in a template derived from the “ESS Handbook for quality reports”.

At this time the national implementation of quality reports following ESS standards started. Eurostat proceeded gradually introducing the new standards in thematic working groups and, sometimes, converting existing quality report templates into ESMS or ESQRS. The use of the ESS Metadata Handler (ESS-MH), the Eurostat tool devoted to compilation, transmission and dissemination of quality reports, based on SDMX technical standard, was advised.

In 2011 the recommendations of the Sponsorship on Quality claimed for a rationalization of the existing standards and tools. In particular, a Single Integrated Metadata Structure should be defined from which clearly differentiated user-oriented and producer-oriented quality reports could be derived. Thus, the Eurostat “Task force on quality reporting” was set up. The Single Integrated Metadata Structure (SIMS; Eurostat, 2014a) was obtained by integrating and harmonizing the concepts included in the ESMS and ESQRS. SIMS is a dynamic and unique inventory of standard reference metadata concepts with definitions and reporting guidelines.

ESMS was recommended as user-oriented and ESQRS as producer-oriented quality report. The same task force updated the “ESS Handbook for quality reports” (Eurostat, 2014b).

In the meanwhile (2012), Eurostat launched the grants on “Horizontal and vertical integration: Implementing technical and statistical standards in the European Statistical System”, with the aim, among others, to support the implementation of ESS metadata standards at national level. Several NSIs, including Istat, benefitted from the grants and implemented national metadata systems (or enhanced the existing ones) to produce quality reports. Such metadata systems should interact with the ESS-MH. The issue of domain specific personalization of standard metadata structures emerged. Eurostat has included html tables within the ESMS and ESQRS concepts to satisfy domain specific needs of reporting. Such html tables deviate from the agreed standards both from technical and from conceptual point of view and complicate the interoperability between the ESS-MH and national metadata systems.

In 2014, in order to face the mentioned issue, to further improve the harmonization of the quality reports and to better plan the implementation process, the Eurostat “Task force on metadata implementation” was set up. It was agreed that new domains adopting ESMS would not add html tables. Versions 2.0 of SIMS, ESMS and ESQRS were defined: the alignment with ES Code of Practice was improved by appropriately merging and re-ordering some of the concepts, and the coherence between ESMS and ESQRS was increased mainly by adding to ESQRS the conceptual metadata from ESMS that were missing in ESQRS. It was also agreed to complete the implementation of quality reporting standards in the ESS by 2018. Finally, technical aspects related to the interoperability between ESS-MH and national metadata systems were discussed, producing a reference document on the possible scenarios (Nielsen et al., 2015) and detailed specifications for the SDMX files that can be accepted by the ESS-MH.

The work carried out was then endorsed by the ESSC and the national implementation of ESS standard quality reports is currently proceeding as scheduled. However, further actions are planned to improve cross-domain harmonization of quality reports’ contents. First of all, the new “ESS Metadata and Quality Reporting Handbook” will be prepared. Secondly, an *ad hoc* training course is being organized by Eurostat under the framework of the European Statistical

Training Programme (ESTP). The first edition of the ESTP “Advanced course on quality reporting” will be held in November 2016. The course will be focused on methodological issues to be faced during the compilation of quality reports.

### **3. National implementation of ESS standard quality reporting: the Istat approach**

Istat had the honor and the pleasure to be involved and to give contribution to most of the mentioned activities. Great improvements have been achieved thanks to the commitment of Eurostat and the cooperation of several NSIs. However, the actions performed at ESS level are not sufficient. Quality reports are compiled by NSIs experts from different domains and support and coordination should be provided them also at national level. Obviously, the approach to be followed at national level can vary depending, e.g. on how the NSI is organized for metadata management or on the availability of a metadata system.

When the national implementation of ESS standard quality reports started, Istat was already equipped with an official system for documenting reference metadata e quality indicators of all statistical processes: SIDI/SIQual (Brancato et al., 2004, Brancato et al., 2012). Since a relevant part of the information required by ESMS and ESQRS was already currently documented in SIDI/SIQual, but the system was not SDMX compliant, Istat took the occasion of the mentioned Grants on “Horizontal and vertical integration: Implementing technical and statistical standards in the European Statistical System” to develop an *ad hoc* subsystem of SIDI/SIQual to produce reference metadata files and quality reports compliant with ESS conceptual and technical standards (Simeoni, 2013).

The main functionalities of the developed subsystem include:

- A set of procedures that extract information from SIDI/SIQual and rearrange it according to what is required by ESMS and ESQRS concepts. For example, in SIDI/SIQual for each statistical process: i) a section is devoted to reporting unit(s) and frame(s); ii) the quality control actions performed to prevent, monitor, correct and evaluate coverage errors are documented together with the statistical business process description; iii) the quality indicators on over-coverage and misclassification errors are reported with the other

quality indicators. One of the procedures puts together the mentioned metadata and quality indicators in order to fill-in the ESQRS “Coverage errors” concept.

- The possibility to map the developed procedures with the items of ESMS and ESQRS or whatever other item included in a template in SDMX format (the so-called Metadata Structure Definition). This function assures a great flexibility of the subsystem. For example, it will be sufficient to map the new templates with the existing procedures to migrate to version 2.0 of ESMS and ESQRS.
- The automatic partial pre-compilation of quality reports and an html editor to verify and complete the reports. The choice of the html editor has been made to assure compatibility with the ESS-MH.
- The creation of the file containing the quality report that follows the specifications provided by Eurostat and can be downloaded and then easily imported in the ESS-MH.

In the last months, the subsystem has started to be used with success. However, the passage from the ESS-MH to the SIDI/SIQual subsystem will be gradual and will be completed by the end of 2016. This is due partly to technical partly to organizational reasons. Indeed, in case of presence of domain specific html tables (see section 2), when SIDI/SIQual subsystem is used for the first time for that domain, an empty version of the quality report should be downloaded from the ESS-MH and manually imported in the SIDI/SIQual subsystem before its use. This manual operation takes time and it should be automatized in the next version of the application. In addition, Istat is currently undergoing a process of modernization of the production of statistics that implies also important changes on the organization and on personnel assignments. In several domains persons in charge of compiling quality reports is going to change and it is not convenient to introduce the new tool before the tasks are clearly assigned. Finally, the idea is to take advantage of the change of software to improve the central coordination in the quality reporting activity. Together with the new tool methodological and technical support for the compilation is offered. To this aim, in the last quarter of 2016 also an internal course on quality reporting will be held at Istat.

#### **4. National dissemination of quality reports at Istat**

Istat has a long tradition in calculating and collecting standard quality indicators in SIDI/SIQual. Long time series of several quality indicators (e.g. over-coverage rates, unit nonresponse rates, timeliness, imputation rates) can be consulted in the intranet version of the system. Unfortunately such indicators are not disseminated on the internet version, where only conceptual and methodological metadata are available. Also the “Quality at a glance” reports, derived from SIDI/SIQual and available on the website for all Istat surveys since 2014, include only timeliness and some information related to unit nonresponse.

After the last round of ESS peer reviews (June 2015) Istat was recommended to extend the systems to report quality indicators to users on a regular basis. One of the improvement actions endorsed by Istat in response to the recommendation consists in the dissemination at national level of ESS standard quality reports by the end of 2016.

Actually, SIDI/SIQual system already includes a documents’ repository where old quality reports produced by surveys under EU Regulation are stored and disseminated. However, it is not an exhaustive and systematic collection. Obviously, quality reports can be disseminated in several ways. A possibility could be simply to download all the quality reports from Eurostat database and to upload and make them available in the internet version of SIDI/SIQual. Another possibility is to create a specific section on the Istat website organized by theme. Also the format of the reports should be decided: a plain file, e.g. .pdf format, or a navigable version? Finally, where is it better to place quality reports? Stand alone or near the statistics they refer to?

In order to answer to all these questions, a quick review of how quality reports are disseminated by the different NSIs of the ESS has been performed. The websites of the 28 NSIs of EU member countries have been visited looking for quality reports. In each website quality reports have been searched under sections devoted to methods, to quality or to metadata or directly typing “quality reports” in the search engine available in most websites.

It resulted that 14 out 28 NSIs have organized the dissemination of quality reports in a systematic and structured way. The remaining half presents situations similar to the Istat one: some quality reports are disseminated but not in a systematic way and/or standard summary

notes on quality or methodology are available in a systematic way but they are not actual quality reports because they do not include information on quality dimensions.

Among the 14 NSIs systematically disseminating quality reports, 5 (35.7%) adopted the ESS standards for reference metadata and quality reporting (mainly ESMS), while 7 (50.0%) defined a national standard. Only 2 NSIs structured the dissemination of quality reports without standardizing their contents (see table 1).

**Table 1. Adoption of standards**

<b>Adoption of quality reporting standards</b>	<b>n</b>	<b>%</b>
No	2	14.3
National Standard	7	50.0
Ess standard	5	35.7
<b>Total</b>	<b>14</b>	<b>100.0</b>

*Source: Review of the websites of EU members' NSIs - April 2015*

As reported in table 2 almost all the NSIs (13 out of 14) chose to have a specific section on the website devoted to quality reports. In most cases (10) the dissemination is organized by theme.

**Table 2. Organization of quality reports on the websites**

<b>Section devoted to quality reports</b>	<b>Organization by theme</b>		
	<b>No</b>	<b>Yes</b>	<b>Total</b>
No		1	1
Yes	4	9	13
<b>Total</b>	<b>4</b>	<b>10</b>	<b>14</b>

*Source: Review of the websites of EU members' NSIs - April 2015*

Usually only the most recent quality report is available, rarely also the previous ones. When the section is not organized by domain the list of statistical process/product is usually reported in alphabetical order. Only in a couple of cases quality reports can be reached through a direct link from data, while the summary methodological notes can often be found “close” to the data. Indeed, quality reports are usually prepared after the release of data and often with a different frequency (e.g. annual quality report for quarterly statistic) even if including quality indicators referring to a specific reference period: in order to not present near the data the quality indicators referred to a different period, quality reports are often disseminated on their own.



Concerning format of dissemination, the choice of the majority of NSIs was for a plain file (mainly .pdf or .html). Only a couple of NSIs presented the reports in navigable format, as a metadata system.

On the basis of the results of the review, Istat designed how the ESS standard quality reports will be disseminated at national level by the end of 2016. First of all, ESS standard quality reports will be disseminated both through SIDI/SIQual system and through the Istat website. In SIDI/SIQual they will be available both on a dedicated section organized by theme (domain) and within the navigation of each specific statistical process in the existing section “Standard quality reports” where also the “Quality at a glance” report are available.

The “Standard quality reports” section could also be linked from I.Stat, the Istat corporate datawarehouse. In SIDI/SIQual all the quality reports produced in the last years following the ESS standard will be available, not only the most recent one.

Concerning the Istat website, the dissemination of quality reports will be integrated in the existing section devoted to the dissemination of the “Quality at a glance” reports. The section is already organized by theme. Under each theme the set of related statistical processes will be displayed and then for each statistical processes will be possible to consult alternatively the “Quality at a Glance” report or the ESS standard quality report. In both cases only the most recent report will be at disposal. Once selected the ESS standard quality report of interest, it will be opened in a new webpage. At first only the higher level headers of ESMS or ESQRS will be displayed, and the report will be dynamically navigable. All the information displayed in the website will be derived by SIDI/SIQual.

## **5. Concluding remarks**

The present paper presents an overview of the activities carried out over the last years on the implementation of ESS standard quality reporting both at European level than with regard to Istat specific experience. Great results have already been obtained but further improvements should still be achieved. In particular, at European level more cross-domain harmonization should be persecuted, while at Istat level efforts to improve dissemination should be spent.

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