**The new quality strategy in the modernised Italian National Statistical Institute**

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**Abstract**

*Under the pressure of common drivers for innovation, the National Statistical Institutes of several countries, including the Italian institute (Istat), have implemented modernisation programmes in their organisations. They are broadly aimed at improving the amount and quality of the statistical information produced, while increasing the efficiency and cost-effectiveness of the organisation. Quality management has a prominent role in the modernisation programmes being an overarching process supporting the organisation at institutional, process and product level.*

*Starting from the early ‘90s, the long-standing Istat quality management investment has produced an advanced and consolidated quality strategy, harmonised with Eurostat guidance, whose main pillars rely on: the setting of shared standards; a spread network of quality pilots; an articulated assessment approach aimed at continuous quality improvement.*

*The initiatives developed so far at Istat, although generally valid, need to be further improved and tailored with respect to the changed statistical production environment and to the shift from an organisation based on domain specific-silos to a more integrated production model. In addition, the tools already developed for documenting, measuring and assessing quality of statistics based on surveys and/or administrative data need to: i) be generalised to cover the unstructured data sources; ii) be managed in a different organisational setting and iii) be extended to consider process performance.*

*The paper will present a proposal on how to re-organise the quality activities to better support the needs of a modernised statistical organisation. Firstly, each element of the quality strategy will be analysed in the light of the modernised Institute and of the recent orientation provided by the European Statistical System Common Quality Framework. Then, a redesigned approach to process and product quality assessment and improvement will be proposed. Finally, the recent activities focused on the quality improvement of the National Statistical System will be shortly described.*

**Keywords:** modernisation, quality

**1. Introduction**

The new European Statistical law, adopted in 2015, is a pillar for the reinforcement of the European Statistical System by strengthening the role of the National Statistical Institutes (NSIs) in the coordination of the relative National Statistical Systems. It also fosters the increase in the use of administrative data for statistical purposes and data integration, as well as the modernisation of the statistical production systems as a means to provide the society with better measurements of economic, social and environmental phenomena. Correspondently, the European Statistics Code of Practice has been updated to better reflect the elements mentioned in the statistical law. Eurostat is also improving the European Statistics Common Quality Framework (ESS CQF) with new quality management elements.

Istat, as many other NSIs, has felt the urgency to modernise its statistical production system, to face, among the others, new challenges as the use of new data sources and the need for more efficient statistical production processes.

Under the drivers of the ESS needs and evolutions and Istat modernisation, a renewed quality policy is being planned, aligned with the recent developments in the ESS CQF, the statistical production challenges and the new internal organisation.

This paper is organised as it follows. The main elements of Istat modernisation program are shortly described, then the main components of the new quality strategy are reported and its implementation are outlined.

**2. Main elements of Istat modernisation program**

As society’s demand for quality statistics has been rising to unprecedented levels, the old production paradigms have been showing to be less and less suitable for the new challenges. For this reason Istat has embarked in the recent years on a modernisation program to improve both the quality of the data produced and the efficiency of their production.

This organisational and cultural change has required overcoming the old stovepipes approach for a more integrated and collaborative system by which the Institute is moving from a survey-based statistical production to a register-based production. The advantages are multiple: a minor cost for the statistical production; availability of continuously updated data which reduces the need for fieldwork for the data collection; a lower burden for the respondents.

The basis of the modernisation program is the Enterprise Architecture, a model used to represent Istat processes and activities under a harmonised language, necessary for the integration of the different areas of the new organisation. Indeed, the new organisation structure sees two pivotal areas: the corporate support department, which offers the resources needed to carry out vital parts of the processes – data collection, methodology, IT and dissemination – and the production department, whose experts are in charge of the specific implementations of the statistical processes depending on their thematic area. The relationships between the two departments are ruled by Service Level Agreements. The statistical processes, under this architecture, are guided by the output, to whose attainment both support and production sectors cooperate and contribute.

Additional details on Istat modernisation program can be found in Istat (2016).

**3. The new Istat quality strategy: innovation and continuation**

The new quality strategy is being designed in the light of: a statistical production based on new types of sources, a different organisation within Istat, the need to guarantee interoperability with other Istat systems relevant for the quality, opportunities provided by the modernisation and the implementation of Common Statistical Production Architecture (CSPA) services, the increased importance of the statistical production regarded as a whole in the National Statistical System. The new approach is also being built on some of the enhancements of the ESS CQF, i.e. customer focus including the internal users of the organisation, process approach oriented to integrated processes, continuous quality improvement. It is under study the possibility to integrate quality and risk management.

Specifically, the main elements enhancing the new approach, that will be further described in the next paragraphs, are: a more formalised support by providing quality services; a greater attention to new product and sources; a wider system of quality indicators and measurements; a quality assessment perspective more appropriate for the current and future situation; a whole view of quality considering the national system.

However, it is worthy to say that it is our intention to capitalise on the valuable work on quality carried out so far. Indeed, the approach adopted in the last decades at Istat has proved to be valid, although it requires some adjustments.

*3.1. Capitalising on the past*

Istat quality strategy has been built over a long period. In the ’90s the first activities were aimed at building a system of measurements, the Istat Quality Documentation System named SIDI-SIQual and an organisation functional to its maintenance (Brancato *et al.*, 2004). The system has been and it is the backbone of Istat quality policy. It stores documentation on reference metadata and quality indicators of Istat statistical processes. The quality indicators are regularly analysed in an aggregated form and provide basis for an objective assessment at institute level (Signore *et al.*, 2012). To document the information in the system a quality pilot network, spread all over the subject matter directorates, has been constituted at the beginning of the 2000 years and is still active. They are formally appointed after a specific training.

More recently (2010-2016) a statistical audit and self-assessment programme has been carried out (Signore *et al.*, 2010), aimed at evaluating compliance towards quality guidelines. These were developed first for the direct surveys, afterwards for processes based on administrative data (Barbalace *et al.*, 2014).

Concerning the coordination of the National Statistical System (Sistan), in 2010 an Italian Code of Official Statistics, largely resembling the European one, was promulgated. Activities were carried out to assess and monitor the compliance at Institutional level to the code (Terracina *et al.*, 2016, in Italian language).

So far, the tools developed for documenting and assessing quality of Istat statistical processes are largely applied to either survey or administrative-based statistical production processes and are based on a silo-organisation. Therefore there is the need to re-think an efficient and targeted quality strategy.

*3.2. Quality services supporting the statistical production*

The centralised quality function provides structured support in the following areas: design of a quality assurance plan for new statistical processes; support in the documentation of process metadata and standard quality indicators; support in the definition of tailored documentation and quality indicators and measurements especially with reference to new products and data sources; support in the production of quality reports for different users; support in the evaluation of specific statistical processes or products. Here, some examples are reported.

New surveys are supported by analysing all the potential sources of errors and advising on the quality assurance plan that can be planned and adopted in order to prevent errors and monitor quality.

The process and its sub-processes for the compilation of the Government Finance Statistics are being mapped and quality documentation and measurements required at every step of the statistical production chain, considering the different nature of the data (survey-based vs. administrative-based) are being analysed.

The production of standard quality reports for Eurostat is supported by an IT function allowing the extraction of the reports directly from the Istat quality documentation system (Simeoni, 2016; Simeoni, 2013) and by a specific training course. In addition, for the new quality reports to be produced methodological support is often required and offered.

*3.3. New products and data sources*

One of the pillars of the Istat modernisation is the creation of an integrated system of registers. The quality of the administrative sources is regularly evaluated and monitored at Istat before they are integrated in specific statistical processes (Cerroni et al, 2014). A framework of quality measures of complex products such as the Frame-SBS register, i.e. the register used for Structural Business Statistics annual estimations, has been suggested (Luzi, 2016). In the new quality strategy, the quality of the registers will be further systematised, by considering both process and product quality. The suitability of the Generic Statistical Business Process Model (GSBPM) to represent the implementation of the registers will be evaluated in the light of the assessment of process quality. Product quality will be documented and assessed looking first at the register as an intermediate output and then by considering the derived estimates, i.e. in a microdata and in a macrodata perspective.

The Istat measurement system, built on SIDI-SIQual, will be enriched with quality measurements of specific sub-processes, such as the integration of different data source and the (massive) use of imputation technique, that are more relevant in a register-based approach to statistical production. Output quality indicators referred to the variables included in the registers will also be considered. On the long-term, also coherence among the estimates derived using the same system of registers will be evaluated. While for the use of administrative data and multiple data sources the methodological framework is more solid, considering the experimental statistics and statistics produced using big data there is the need to first reinforce the knowledge on the statistical processes, their representation and measurements, before including these processes in the regular quality documentation, assessment and reporting flow.

*3.4. Quality measurements and assessment in the modernised organisation*

The new system of quality indicators and measurements will be guided by the need to fulfil several scopes. The SIDI-SIQual will continue to be the pillar of quality documentation and measurement. In continuation with the past, the ESS Quality and Performance Indicators required by Eurostat in the quality reports will be managed and made available for systematic, coherent and efficient quality reporting. In addition, tailored quality reporting for national users will continue to be delivered and extended to the new types of processed and data sources. The SIDI-SIQual system will be the basis for the quality assessment and continuous quality improvement will continue to be a relevant and crucial element of the quality management system.

The set of statistical process and product-oriented quality indicators currently used for the aforementioned indirect quality monitoring and assessment with be further extended to include indicators not yet developed or defined, as the new ones for the statistical registers.

However, the new quality policy aims at increasing Istat efficiency by reducing the burden in calculating quality indicators. Whenever possible the system has already been integrated with several other corporate systems through different technical solutions, and it will be further enhanced in that direction. The idea is to take advantage of the centralisation of some phases of the production process, driven by the modernisation, to derive automatically standard quality indicators, developing interoperability with other corporate systems. For example, further integration with the data collection systems will allow the collection of indicators on the response burden of business surveys. The development of a generalised process for business statistics managing the GSBPM “process” phase will allow to further automatize the computation of Editing and Imputation quality indicators and to consider new ones. This approach will allow at the same time to enlarge the set of standard quality indicators in the system, to reduce the burden for the calculation of quality indicators and improve the coherence of quality information available throughout the Istat corporate systems.

Besides addressing the external users’ needs with a variety of quality reports, quality indicators supporting the internal users’ needs in data exchanges will be considered.

Finally, the Istat modernisation addresses towards the need to accompany the quality evaluation of single statistical processes with the evaluation of corporate functions. Some indicators supporting the quality analysis of specific phases in a cross-sectional perspective (e.g. data collection, data dissemination, …) or overarching processes (metadata management) will be integrated in the quality management system. First, this assessment will be finalised to statistics quality. For example, the dissemination phase could be evaluated with respect to the clarity and accessibility quality dimension. Metadata management monitoring and evaluation could be carried out by developing new indicators on the compliance to standards on the use of classifications, and then supporting towards the adoption of the standards.

Secondly, a view in terms of efficiency of processes’ performance will be added, with the aim of supplementing what is being carried out by the sector in charge of managing the service level agreements.

In the long-term quality, methodological and procedural policies will be developed and compliance assessed.

*3.5. Quality of the National Statistical System*

During the European Peer review of 2015 on the ISTAT activity, a series of actions have been recommended for: a program for transferring know-how on quality management to the bodies of the National Statistical System (Sistan); the redefinition of the Sistan; the strengthening of its coordination and quality improvement, also through the start up of an annual audit program on the European statistics produced by the Other National Authorities (ONAs).

Therefore, ISTAT assumed the commitment to prepare a statistical audit plan that allows an analysis of the production processes of the ONAs with the aim to attain the quality continuous improvement of the statistics produced by single public authorities. This has also been realised throughout a sharing of the objectives and cooperation with the ONAs.

During the 2017, Istat developed tailored tools for the European statistics produced by the ONAs: the quality guidelines, the assessment questionnaire, the operative manual, the template of the final report. A consultation for the evaluation of the guidelines by the ONAs, in order to gain their opinions on the adequacy and completeness of the contents and on the clarity of the manual produced, was carried out. A test on two ONAs’ processes in order to evaluate the effectiveness of the auditing questionnaire was conducted.

The quality guidelines contain principles, suggestions, quality indicators and actions that could be adopted to improve the quality of ONAs statistical processes. They follow the relevant phases in which a statistical production process can be articulated, considering both survey design and the use of data from administrative sources. In the audit questionnaire the same principles stated in the quality guidelines are reported, followed by some questions useful to evaluate if the process meets the standards underling the principles. The operative manual contains the instructions for the actors involved in the auditing procedure.

The auditing interviews are carried out by four Istat experts, from the following Istat sectors; quality, methodology, domain-production and Sistan coordination office, respectively. At the end of the interview, the experts draw a final report with improvement actions that is completed by the audited process managers. The improvement actions are monitored by Istat.

The evaluation program was launched at the beginning of 2018 with an initial target of three audits per year.

**4. Conclusions**

The quality strategy outlined in the previous sections anchors to the modernisation and its implementation status. It is an ambitious program that has to take into account the available resources. It will be realised following a stepwise approach and considering that some tools are foreseen in a long-term perspective.

So far priority has been given to the following activities. As suggested in the last Eurostat peer reviews, activities have been oriented towards two main areas: *i)* reinforcing the quality in the Sistan and in particular in the European statistics produced by the ONAs and *ii)* providing the external users with more information on quality.

A lot of efforts have also been devoted to assuring the functioning of the SIDI-SIQual documentation system under the new organisation and in exploiting the opportunities provided. For example the computation of frame and nonresponse quality indicators has been centralised in the new data collection directorate as well as the extraction, integration and publication on Istat website of homogenous information for the surveys’ participants. These functions have required a renewal in the structure and composition of the traditional SIDI-SIQual pilot network.

Currently the interoperability with existing systems and the new projects to exploit the quality information spread over the institute is being studied. The theoretical framework on the quality of multisource statistics is being translated in operational terms in order to properly plan the measures and indicators supporting the quality activity in the new production environment.

The full procedure for the establishment and approval of methodological standards is still undergoing, therefore the compliance towards these standards cannot be set yet.

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