

Quality work in Statistics Norway

TALL

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Preface

As a professional independent institution with the main responsibility to meet the need for statistics about the Norwegian society, Statistics Norway (SN) is dependent on broad trust. Trust depends on the quality of our products and services satisfying user needs. Quality work is also the key to improved efficiency and modernisation.

Statistics Norway has worked systematically with quality for many years. This document summarizes the principles of quality work with reference to definitions, frameworks and tools, anchored in international standards. References are given to other relevant documents covering more specific areas.

The document was written by Hans Viggo Sæbø.

Statistics Norway, 17. januar 2019

Christian Thindberg

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1. What is quality?

Quality is defined by the International Standards Organisation (ISO000:2015) as:

- *Quality is the degree to which a set of inherent characteristics of an object fulfils requirements.*

A simple version of this is "fit for use".

It is the users' needs that define the quality. Different users may have different needs that must be balanced against each other to give the quality concept a concrete content.

For statistics, the general definition is operationalised by specifying a set of factors or dimensions that characterise quality of the product:

- Relevance
- Accuracy and reliability
- Timeliness and punctuality
- Coherence and comparability
- Availability and clarity

Costs both in Statistics Norway and in the society as a whole must be taken into account (as influenced by the response burden). The content of the quality dimensions is elaborated in Appendix 1.

The factors have been developed through international statistical cooperation and are included as principles of product quality in the European Code of Practice (see below).

2. Frameworks for quality work

2.1. General frameworks

A quality framework provides the frame for the identification of quality challenges and actions for their resolution, and it is a prerequisite for systematic quality work.

A framework for systematic quality work and management of this consists of definitions, principles and a model that link the principles together. There are various general quality frameworks with application to any organisation, such as TQM (Total Quality Management), ISO, Six Sigma, EFQM (European Foundation for Quality Management), Balanced Scorecard, Lean and Lean Six Sigma. These systems are largely based on common definitions (as of quality above) and principles, but they vary with regard to main focus and formalisation. In ISO emphasis is placed on certification, while Six Sigma focuses on quality control using statistical methods. Lean emphasises improvement in efficiency by reducing waste.

In many ways, TQM, which was developed in the last century, is the mother of all general quality systems. Concepts and principles developed here are common to all systems developed later. Statistics Norway's quality work has been inspired by TQM and can be characterized by the following principles:

- Customer orientation
- Process orientation
- Facts as the basis for improvements
- Participation by all
- Management and continuity

These systems and principles are general because they apply irrespective of the type of business. There is a set of values and principles for official statistics which goes beyond these. This applies in particular to professional independence, objectivity and protection of data on individuals. Such requirements for official statistics were first formulated in the UN 10 Principles of Official Statistics, adopted in 1994. Since then, these principles have been incorporated into more comprehensive frameworks for statistics.

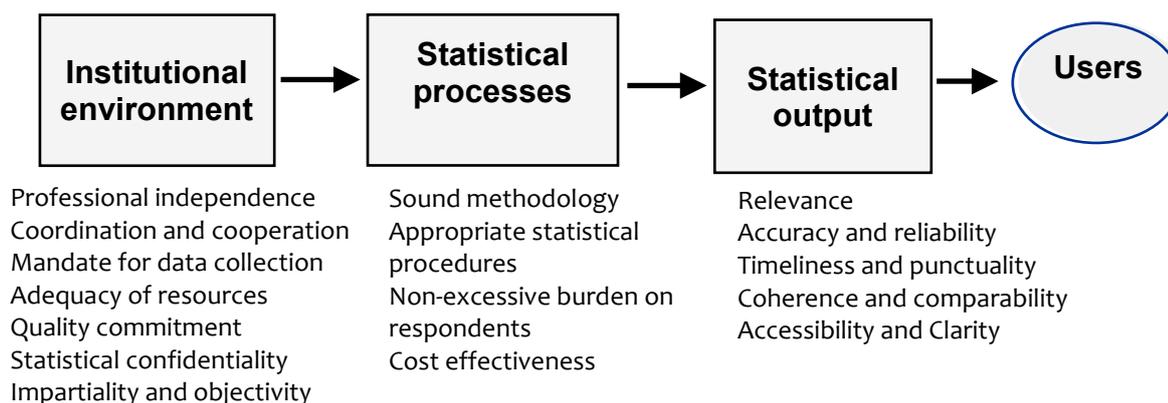
2.2. European Statistics Code of Practice as a quality framework for statistics

In Europe and thus in Norway, the European Statistics Code of Practice (CoP) constitute the cornerstone of a common framework for quality in the statistics.

CoP is formulated as a set of principles with underlying indicators. A set of recommended methods or practices ("Quality Assurance Framework - QAF") has also been developed for these.

CoP follows a TQM-like model from user needs for products to underlying processes and the institutional environment which is specific for statistical institutions (see figure 1). The indicators linked to the output are identical to the definition of product quality in statistics above.

Figure 1. Quality model and European Statistics Code of Practice



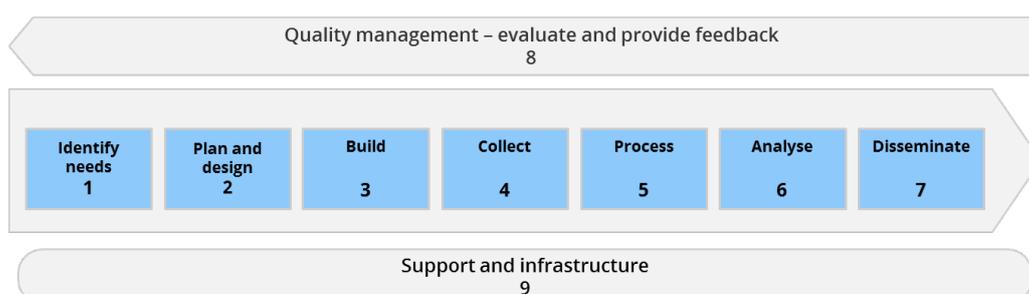
Other quality frameworks developed through international statistical cooperation include the UN's National Quality Assurance Framework (NQAF) and frameworks developed by the IMF and OECD. The OECD recommendations on good statistical practices as published should also be mentioned.

The Code of Practice was developed in 2005 and revised in 2011 and 2017. CoP applies to "European Statistics", that is, statistics reported to Eurostat and also published here. But it is natural that the same quality requirements that form the basis for "European Statistics" constitute the basis for Norwegian official statistics as well. A description of the term official statistics can be found at <http://www.ssb.no/en/omssb/om-oss/vaar-virksomhet/offisiell-statistikk>. It is stated here that institutions other than Statistics Norway can produce official statistics. European statistics will also be Norwegian official statistics.

2.3. Business process model

The key to improving product quality lies in the improvement of the processes, and the focus has been on standardisation and modernisation of these in recent years. Statistics Norway has its modernisation program, and more use of common solutions is an important part of our strategy. An important tool in this context is the business process model (see figure 2), which is similar to the corresponding model developed in an international statistical collaboration ("[Generic Statistical Business Process Model - GSBPM](#) "). The model can also be used as a reference for documentation and in the improvement work in general.

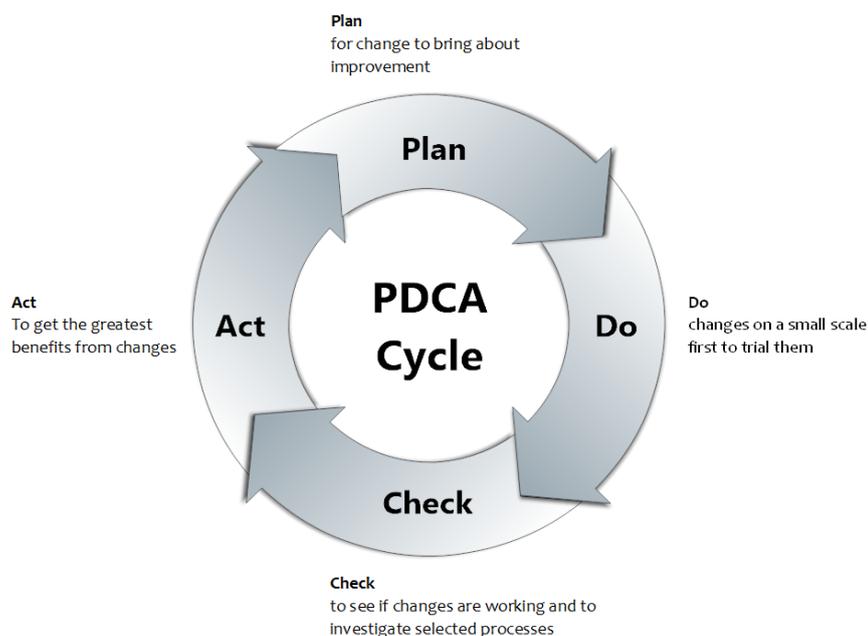
Figure 2. Statistics Norway's business process model (level 1 of 3)



2.4. Continuous improvement and lean

User needs change. The same does the opportunity to produce statistics, both because of new data sources and new technology. What is good quality today is not necessarily good quality tomorrow. Continuous improvement is an overall goal of all quality work. The so-called quality wheel illustrates the process of continuous improvement (see figure 3). Equally important as work with quality assurance and improvement of existing processes is innovation which involves new routines and systems.

Figure 3. Continuous improvement work



Source: SmartDraw CI

Much of the systematic improvement work in Statistics Norway is carried out within the framework of lean. Lean emphasizes reduction of waste, as mentioned above, but largely builds on the same principles as TQM. Statistics Norway has had a Lean commitment since 2012, aiming to increase productivity in production processes to reduce costs and improve the timeliness of statistics. However, all aspects of quality that are measured in terms of the principles and indicators of the Code of Practice should be taken into account.

The Lean project has first focused on processes within the individual departments, then it is working on cross-cutting processes where it is often the most to get. In addition, Lean is working on management processes. The long-term goal is to create a culture for continuous improvement in Statistics Norway. Lean supports the quality work in SN's modernization program.

Various tools, methods and techniques for development and quality assurance are discussed in the following.

3. Quality assurance tools

Tools for quality assurance comprise user surveys, quality reports, the use of quality indicators, measurement and analysis of process variables, risk management and internal or external quality reviews as European peer reviews. In addition, simple tools supporting improvement work include flowcharts and tools for communication and cooperation.

The use of statistical methods is central in the improvement work, such as methods for sampling, editing, estimation and analysis. References to the description and guidelines for using good methods in production of statistics are given below, along with references to quality assurance documents in specific areas.

3.1. User surveys

A user survey is a survey aimed at assessing how satisfied users are with SN products or services as a basis for improvements. One can distinguish between surveys aimed at different known or defined user groups (for example, paying users, or users of ssb.no), and general surveys that measure trust in Statistics Norway or official statistics, regardless of whether they are users or not (so-called image surveys). The surveys can cover all our products and services or delimited and specified parts.

Statistics Norway conducts various user surveys. A user survey of our web-site ssb.no was conducted in 2014. An examination of SSB 's trust was conducted in 2016.

3.2. Quality reports

A quality report for users provides information about the most important quality components associated with a statistical product. It can be based on quality indicators (see next section). Quality reports are important for producers and management as well. The requirements for a quality report depend on the user group.

All data Statistics Norway provides to Eurostat or other international organisations are followed by quality reports structured according to international standards, such as the Code of Practice in Europe.

Eurostat has provided guidelines for these ([ESS Handbook for Quality reports 2014](#)).

For Statistics Norway's users, "About the statistics" is a standardised quality report, even if it contains information about more than quality. "About the statistics" is published on ssb.no along with all releases of statistics. We have about 400 such reports. In addition to information on quality components such as relevance, accuracy and timeliness, "About the statistics" provides information about definitions, background for statistics, production and use of methods.

In connection with the agreements Statistics Norway has with owners of administrative data sources that we use in the statistics production, we have quality reports for each register. In this case, the quality should reflect the suitability of the register for use in statistical production, not just each register but also by linking different registers. The quality criteria are therefore slightly different from those

for the statistics products. They include technical controls, accuracy, completeness, time (such as timeliness and punctuality) and integrability (by linkage of registers). We currently have agreements with 33 owners of administrative data systems accompanied by quality reports for about 100 such systems.

3.3. Quality indicators

Quality indicators are used in quality reports, but especially by management to get a quick overview of the development of important quality components such as timeliness. SSB includes a set of overall (i.e. aggregated to institutional level) quality indicators in the annual and half-yearly reports and in the dialogue with the Ministry of Finance. Other indicators cover the resources (economy and competence) and production volume (like number of publications). Some of the indicators are linked to targets, these are highlighted below:

- Hits and number of external users on ssb.no (may be associated with relevance)
- Number of articles or references in media (relevance)
- **Timeliness for monthly, quarterly and annual statistics**
- **Punctuality**
- **Response rates for mandatory and voluntary surveys** (can be linked to accuracy)
- Errors of different severity (can be linked to accuracy)

3.4. Process variables

A process variable indicates the quality of a process. So-called Critical Process Indicators (CPIs) are factors that may vary when the production process is repeated, and which greatly affect product quality (such as accuracy and timeliness of the statistics). Examples are response rates, degree and type of editing in addition to resource usage. Analysis of such variables provides the basis for improvement of quality and/or efficiency.

3.5. Standardisation

The development of standards and standardised solutions in statistics production will contribute to both quality and cost-effectiveness, in addition to reducing vulnerability by reducing the number of systems known to only a few. Statistics Norway currently has several standardised solutions, for example the system for coordinated selection of samples (NORSAMU - will also help to distribute the response burden) and "Integrated System for Editing and Estimation" for editing and estimation.

3.6. Risk management

Risk analysis and management should prevent unwanted consequences with regard to both staff, finance and quality deficiencies (e.g. errors in the statistics). Statistics Norway's risk analyses are based on international and national standards. Risk is defined as the product of probability (for something to go wrong) and consequence. This is assessed by management and serious risks in terms of high probability and consistency are followed up with measures to reduce these.

Risk analyses are carried out on different levels, from the institutional level down to project level. They are in particular important in connection with reorganisations and major projects such as the modernisation program.

3.7. Quality reviews

Systematic review of quality in statistics and production processes is an effective tool for quality assurance. Statistics Norway conducts such reviews regularly. The reviews are conducted by an internal team of 4 - 5 people with expertise from quality work, statistics production, communication, methods and lean.

Quality review is based on three main elements:

1. Self-assessment with additional documentation
2. Review of the production process (meeting with producers)
3. Focus group and interviews with users.

The self-assessment follows the principles and indicators in the Code of Practice (except Principles 1-3 which are most relevant on the institutional level and not on the level of specific statistics).

During the process review, an overview of the main processes behind the statistics is considered. In this Statistics Norway's business process model is used as a framework.

The reviews result in a report that includes a suggestion for improvement points for the current statistics. Based on these the responsible division develops a list of actions that is followed up annually.

Compared with the lean projects, quality reviews have more character of control or auditing, which is also relevant as a follow-up of previous lean work. But the work of lean and quality reviews will build on the same basis and quality indicators. Quality reviews can be seen as part of Statistics Norway's internal control (covering statistics production).

3.8. European peer reviews

All national statistical institutions in Europe are evaluated regularly in accordance with the European Code of Practice. Statistics Norway was assessed in 2007 and in December 2014 by European teams. The assessments have resulted in reports that contain recommendations. In response to these, Statistics Norway has prepared action lists that are followed up by Eurostat annually.

The review in 2014 concluded that Statistics Norway and the Norwegian statistical system are in good compliance with the CoP. Two innovative practices were highlighted: the EDAG project (now the A report implying digitally coordinated information gathering from employers about jobs, earnings and taxes to the Norwegian Tax Administration and the Norwegian Labour and Welfare Service in addition to Statistics Norway), and the agreements with owners of administrative registers, including quality reports for the registers.

This review resulted in 24 recommendations that are followed up. This concerns the modernisation of the Statistics Act, strengthening the role of Statistics Norway in relation to other Norwegian statistical producers, quality management, dissemination, resource utilization and competence.

4. Documentation

4.1. Principles and guidelines on ssb.no

Generally

<http://www.ssb.no/en/omssb/om-oss/vaar-virksomhet>

<http://www.ssb.no/en/omssb/om-oss/vaar-virksomhet/kvalitet-i-statistikken>

<http://www.ssb.no/en/omssb/styringsdokumenter/formidlingspolitikk>

European guidelines

<http://www.ssb.no/en/omssb/styringsdokumenter/lover-og-prinsipper/retningslinjer-for-europeisk-statistikk>

Equal treatment

<http://www.ssb.no/en/omssb/styringsdokumenter/formidlingspolitikk/prinsipper-for-likebehandling>

Treatment of errors

<http://www.ssb.no/en/omssb/styringsdokumenter/formidlingspolitikk/prinsipper-for-feilretting>

Revision

<http://www.ssb.no/en/omssb/styringsdokumenter/formidlingspolitikk/prinsipper-for-revisjon>

Confidentiality

<http://www.ssb.no/en/omssb/personvern/personvern-og-datasikkerhet>

4.2. Other relevant documentation

International references

European Statistics Code of Practice and Quality Assurance Framework (QAF):
<http://ec.europa.eu/eurostat/web/quality/european-statistics-code-of-practice>

Generic Statistical Business Process Model (GSBPM):
<https://statswiki.unece.org/display/GSBPM/GSBPM+v5.0>

UN Fundamental Principles of Official Statistics :
<http://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx>

OECD recommended practices in statistics :
<http://acts.oecd.org/Instruments/ShowInstrumentView.aspx?InstrumentID=331&InstrumentPID=380&Lang=en&Book=False>

European Peer Reviews - Reports and Action Plans :
<http://ec.europa.eu/eurostat/web/quality/peer-reviews>

Appendix 1 Quality Dimensions

The table gives an overview of the content of the different product quality dimensions in the statistics.

Definition	Important dimensions
<p>relevance To what extent the statistics meet current or potential user needs</p>	<ul style="list-style-type: none"> • Who are the users • What are the needs • How well does the statistics meet these needs
<p>Accuracy and reliability How close to an estimated result is true value</p>	<ul style="list-style-type: none"> • Sampling errors • Other errors, such as: <ul style="list-style-type: none"> ○ Coverage errors ○ Non-response errors ○ Measurement errors ○ Processing errors ○ Model errors
<p>Timeliness and punctuality Timeliness specifies the time period between publication and the period of data referenced.</p> <p>Punctuality measures whether the planned publishing date is observed and, if appropriate, the deviation</p>	<ul style="list-style-type: none"> • Frequency • Production time • Punctuality in relation to the statistics calendar
<p>Coherence and comparability Coherence indicates the extent to which statistics from different sources or compiled using different methods, but which refer to the same phenomenon, are similar.</p> <p>Comparability indicates the extent to which the statistics can be compared over time and place.</p>	<ul style="list-style-type: none"> • Coherence between any preliminary and final figures • Coherence between short-term statistics and annual statistics • Coherence with other statistics in the same area, including the national accounts and other institutions' statistics where applicable • Comparability over time • Comparability over geographical areas
<p>Availability and clarity Availability indicates how easily users get statistics and data with explanations</p> <p>Clarity indicates how well the statistics are presented as well as the quality and adequacy of metadata.</p>	<ul style="list-style-type: none"> • Statistical publication on ssb.no • Analyzes and graphics • Statbank • «About the statistics»