STATISTICS QUALITY ASSURANCE FRAMEWORK

QUALITY GUIDELINES

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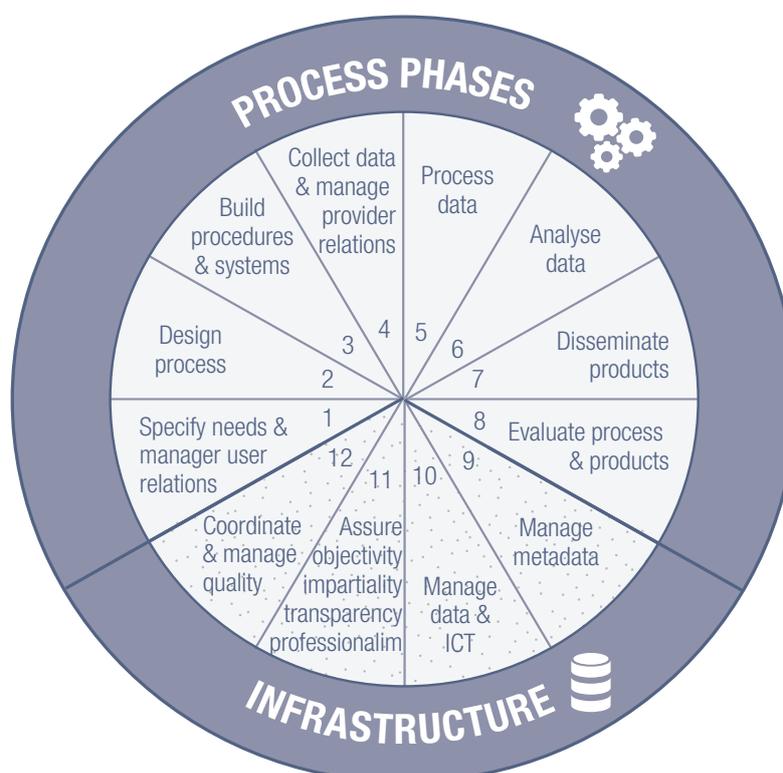
1. QUALITY GUIDELINES

1.1. INTRODUCTION

The quality guidelines are presented in two broad groups: those applying to each individual statistical production process within UNCTAD; and those applying to UNCTAD's statistical infrastructure as a whole.

The guidelines for a statistical production process are subdivided into eight groups corresponding to the phases defined in the *Generic Statistical Business Process Model* (GSBPM) published by United Nations Economic Commission for Europe (UNECE). The GSBPM is the international standard for describing statistical production processes.

The remaining activities associated with statistical infrastructure are presented in four groups, namely: manage metadata; manage data and ICT systems; assure professional independence and impartiality; and coordinate and assure quality. Even though not explicitly referenced, staff training is part of every subgroup.

FIGURE 2: QUALITY GUIDELINES STRUCTURE

2. PROCESS GUIDELINES

These guidelines relate to each individual statistical production process conducted by UNCTAD and should be applied by the organisational unit responsible for the process. Guidelines for activities 2.1 - 2.3 are developmental or design and are primarily required prior to the first data collection cycle of a new or redesigned process. The guidelines 2.4 - 2.8 are operational and are repeated for each cycle of the process.

DESIGN AND DEVELOPMENT

2.1. SPECIFY NEEDS AND MANAGE USER RELATIONS

SCOPE

This covers all activities associated with engaging users to identify their statistical needs, proposing strategic options for meeting these needs, and, if required, preparing a business case for changes to the production process and products. It includes: maintaining a knowledge of, and good relationships, with users, and examining their statistical needs in detail; checking the extent to which current statistical production process and other data sources meet these needs; defining the general content of new or changed statistical products to meet the needs; and preparing a business case where needed to secure approval and resources to re-engineer the production process and/or produce new or changed statistics.

GUIDELINES

UNCTAD should:
a) categorise users into groups according to their type of use and statistical needs;
b) regularly review user requests, queries and comments, and identify new or changing needs;
c) conduct user satisfaction surveys on a regular basis;
d) regularly determine any changes in needs for statistical products/services;
e) identify most important users, discuss their needs and specify in detail the corresponding data requirements;
f) establish memoranda of understanding or service level agreements for provision of statistics to key users; and
g) consult with key users on proposed changes to statistical products.

2.2. DESIGN PRODUCTION PROCESS AND SUPPORTING INFRASTRUCTURE

SCOPE

The statistical activities in this group follow from, and build on, the results of specifying user needs. They include the research and design work needed to define (or redefine as appropriate) the statistical concepts and indicators, and the data collection, processing, storage and dissemination procedures required to produce the envisaged statistical products. They include specification of the metadata that are inputs to and outputs from the sub-processes within the production process, also design of the systems and workflows that support and enable efficient conduct of all the sub-processes.

GUIDELINES

UNCTAD should:

a) define and explain the scope and content of the data to be collected, i.e. countries to be included, indicators and classifications. Overlapping with other statistical production processes/agencies should be avoided;

b) identify and use the most appropriate concepts, definitions, and classifications, taking advantage of those already developed and used by the international statistical community;

c) identify and review all possible available data sources and select the most appropriate;

d) design efficient and effective data acquisition systems and procedures, including formal agreements with providers where required;

e) design efficient, effective and integrated data processing procedures and systems for coding, verifying, estimating, and integrating data, and assembling data products, using internationally accepted methods to the fullest extent possible;

f) design statistical products, including tables, datasets, databases, and analyses in accordance with the specified data requirements;

g) identify and include all the metadata required to support data collection, processing, analysis and dissemination, and to inform users; provide opportunities to interested staff in other units within UNCTAD to contribute to the development or redevelopment of the data production process;

h) check the coherence of statistical concepts with statistics produced by other units in UNCTAD and eliminate or justify any differences; and

i) involve experts within and outside UNCTAD, whenever available, in designing processes and products.

2.3. BUILD STATISTICAL PROCEDURES AND SYSTEMS

SCOPE

The statistical activities in this group cover building procedures and systems to implement the production process, and to use the supporting infrastructure, and testing them prior to production. They include identifying and preparing the data collection tools, data repositories, processing tools, management control tools, and metadata management tools, making use of UNCTAD statistical infrastructure wherever available and appropriate. They include configuring workflows to handle the data as they are transformed from acquisition to dissemination. They include producing documentation and training production staff, providers, and users in use of the systems and procedures.

GUIDELINES

UNCTAD should:
a) prepare efficient data collection tools, taking advantage UNCTAD statistical infrastructure and using the latest technologies;
b) prepare efficient and effective processing tools and metadata management tools, taking advantage of UNCTAD statistical infrastructure and using the latest technology;
c) prepare appropriate and efficient data storage mechanisms that interface well with the collection and processing tools, taking advantage of UNCTAD statistical infrastructure and using the latest technology;
d) configure smooth workflows in which all activities within the entire production process fit together efficiently without gaps or redundancies;
e) document all systems and procedures;
f) train production staff, providers and users in use of the systems;
g) specify and meet deadlines for introduction of new statistical products and/or reengineering of statistical processes; and
h) test all new procedures and systems before putting them into production.

OPERATIONAL GUIDELINES

2.4. COLLECT DATA AND MANAGE PROVIDER RELATIONS

SCOPE

The statistical activities in this group refer to the actual acquisition of data, using the various sources and collection modes specified in the design phase, using the tools prepared during the build phase and storing the acquired data securely in an appropriate repository. They include implementing procedures and systems for data collection from databases of national and international organisations, including follow-up procedures in the event of dubious or missing data values. They include liaising with national organisations that are collecting or providing data specifically in response to requests from UNCTAD, making them aware of the reasons for and specifics of the data required, and responding to their comments, queries and complaints. They include ensuring that the data and associated metadata are loaded into a suitable repository.

GUIDELINES

UNCTAD should:

a) implement procedures to obtain data and corresponding metadata direct from the databases of national, international or commercial organisations, where available;

b) ensure that national organisations collecting and supplying data are familiar with the reasons for data collection and the precise meanings of the indicators to be provided;

c) implement efficient and effective procedures for collecting data and associated metadata from national organisations;

d) make provision for responding to comments, queries and complaints from national organisations;

e) monitor and follow up non-responses and partial responses from national organisations and thus ensure that as much of the required data and metadata are collected as possible;

f) ensure the risk of errors in data and metadata acquisition is minimised;

g) minimise the reporting burden on providers; and

h) ensure that all information concerning data and metadata flows between an organization within a country and UNCTAD is reported to the country national statistical office.

2.5. PROCESS DATA

SCOPE

The statistical activities in this group refer to the data acquisition, integration, verification, editing, and harmonisation of incoming data and their preparation for analysis. They include integrating data from various sources: classifying and coding them where needed; applying checks that identify missing, invalid or inconsistent data or metadata; imputing values where the data are inadequate or in error; applying adjustments to harmonise data across countries; deriving values of indicators based on data acquired; producing estimates for countries for which no data are available; and storing data and metadata in databases from which data can be readily extracted for analysis purposes, statistical products can be compiled, and internal users can make extracts.

GUIDELINES

UNCTAD should:
a) implement efficiently and effectively the procedures and systems for data verification, editing, harmonisation, and estimation including a full range of validity checks and edits;
b) implement efficiently and effectively the procedures and systems for aggregation, including production of totals, averages and ratios for regions, and measures of dispersion where relevant;
c) implement efficiently and effectively the procedures and systems for storage of data and metadata in an internal database from which statistical products can readily be compiled and internal users can take extracts; and
d) collect, review and analyse all operational metadata, including, in particular, the number of countries for which data are adjusted or modelled.

2.6. ANALYSE DATA

SCOPE

The statistical activities in this group include to the analyses required for verification of the statistical products and their preparation for dissemination. They involve preparing draft statistical products and checking whether they meet the needs for which they were designed. They include scrutinizing, analysing and explaining the data in relation to expectations and identifying divergences from expectations. They include finalising the statistical products including commentary, interpretation notes, briefings, quality indicators and other relevant metadata that will accompany the data.

GUIDELINES

UNCTAD should:

a) prepare and review draft data products and scrutinize, analyse and explain the data in relation to expectations;

b) compare the data with data for previous reference periods and check for comparability over time;

c) confront the data with related data from other sources (internal or external) and check for coherence;

d) view the data from all perspectives and ensure there is an in-depth understanding of the data content before dissemination; and

e) discuss the results with internal experts and otherwise check that statistical products and associated metadata are fit for purpose before external dissemination.

2.7. DISSEMINATE STATISTICAL PRODUCTS

SCOPE

The statistical activities in this group refer to the dissemination of the statistical products to internal and external users. They include: formulating and applying a dissemination strategy, including a release schedule and pricing policy; reformatting the data and metadata as required and loading them into publicly accessible databases; and preparing and disseminating printed publications in accordance with UNCTAD publishing and presentation guidelines. They include: notifying users of the release of the statistical products; giving briefings for key users and user groups; promoting the products to ensure that they reach the widest possible range of users; and managing communications with internal and external users, including ensuring that user queries are recorded and that responses are provided.

GUIDELINES

UNCTAD should:

a) implement efficiently and effectively the procedures and systems for data dissemination;

b) notify internal users and enable their access to statistical products at the earliest possible opportunity;

c) prepare statistical products in accordance with relevant UNCTAD publishing and presentation guidelines;

d) maximize internal and external interpretability of the data products by accompanying them with appropriate metadata and quality indicators; and

e) ensure that products are timely and punctual by maintaining and adhering to detailed production and release schedules;

f) disseminate statistical products externally, including making databases accessible via the web site and preparing material for printed publications;

g) share information about new or revised statistical products with other units in UNCTAD that are involved in data collection thereby maximizing data coherence and minimizing the risk of duplication of effort;

h) give briefings to key users, including senior officials of relevant international, national members of think tanks, academia and the media;

i) promote and facilitate internal user access to the data;

j) promote and facilitate internal user understanding of the data and their limitations, through provision of metadata describing procedures and operations and through discussions and training sessions;

k) promote products externally via wikis and blogs and social media to ensure that they reach the widest possible audience; and

l) manage communications with internal and external users by ensuring that user queries are recorded, that responses are provided.

2.8. EVALUATE PROCESS AND PRODUCTS

SCOPE

The statistical activities in this group refer to evaluation of the quality of the process and products, including the services provided by the supporting infrastructure, at the end of the process cycle. It includes: defining the evaluation objectives and procedures; establishing the evaluation team; assembling the relevant documentation; analysing the documentation; discussing the statistical processes, products and/or services with the staff responsible for them, and with key users and providers; identifying quality and performance issues; and making recommendations for improving quality and performance.

GENERAL GUIDELINES

UNCTAD should:

a) review and become familiar with quality concepts and the need for quality assurance; and

b) produce quantitative and qualitative measures to assess the quality of the statistical production process and its outputs.

REFERENCE DOCUMENTATION

UNCTAD should have a central repository where all methodological documents, including those outlining scope, definitions and classifications are stored for reference. All important process documentation should also be stored in this repository. These metadata should, as a general principle, be made available to the public.

3. INFRASTRUCTURE GUIDELINES

The following infrastructure guidelines refer to activities that cover all phases of the statistical production process, i.e., that are, or should be, part of every phase. These activities should be coordinated at UNCTAD level and carried out using statistical infrastructure that is available to all statistical production processes conducted by UNCTAD.

3.1. MANAGE METADATA

SCOPE

The statistical activities in this group cover all phases and touch on every aspect of production process and its products. They include identifying and classifying the various types of metadata of interest; determining how they are to be obtained, recorded, accessed and used; building appropriate procedures and systems to do so; and analysing the resulting metadata in order to better understand and improve the production process and products. The overarching goal is to ensure coherence of the final products across UNCTAD by consistent creation and use of metadata across all phases of each production process. To provide a framework for description of metadata in the UNCTAD SQAF, they are divided into two distinct groups: Structural metadata and Reference metadata.

Structural metadata denotes metadata that act as identifiers and descriptors of the data. Structural metadata (or occasionally referred to as definitional metadata) are those metadata that directly describe the various data items that are input, transformed, or output during the different phases of the production process. Examples of structural metadata include labels of statistical indicators and dimensions and attributes used to organize (i.e. to structure) them, as well as code lists used to populate the dimensions and attributes. Other examples of structural metadata are the specific wording of survey questions used in the data collection process, as well as the description of the tables in a database system, or the labels of the rows and columns of an output table. Structural metadata are the most frequently recorded and best understood type of metadata as they are essential in handling the data.

Reference metadata designates metadata that provide further information about the nature, quality and meaning of the statistical data. They are reported not as an integral part (or content) of a data set per se, but attached to it as a whole, providing users with the necessary context to facilitate proper use and interpretation. Very often, reference metadata are associated not with specific observations or series of data, but with an entire collection of data or even with the institutions providing the data.

From a content point of view, reference metadata can be broken down into the following categories:

• Conceptual metadata: Information on the concepts, definitions and classifications used in a dataset, including their practical implementation;
• Methodological metadata: Description of methods used for the generation of data and statistics. These metadata (sometimes referred to as Process metadata) describe the specific phases and sub-processes involved in the statistical production process (e.g. the verification rules applied during data entry or data verification). Methodological metadata may be normative, when they are meant to drive way data and statistics are produced (whether by automated or manual processes), or descriptive, when they describe elements of the statistical production process as they are (without driving them);
• Quality metadata: Information describing the different quality dimensions of the statistical data. Such metadata are the source of quality and performance indicators; and
• *UNCTAD metadata*. These are metadata that are designated as UNCTAD standards, for example, a standard industry classification, standard concepts, standard sampling methods, standard operating procedures.

GENERAL GUIDELINES

UNCTAD should:
a) identify and fully document the various types of metadata, and the needs for and uses of them;
b) identify, design, build and operate a comprehensive set of metadata management tools, taking advantage of UNCTAD statistical infrastructure wherever available;
c) appoint a registration authority for each metadata type;
d) register metadata using a registration process that is well documented so there is clear identification of ownership;
e) ensure that, to the fullest extent possible metadata are active in the sense that they are required and drive procedures, thereby ensuring they must be kept accurate and up-to-date, and paving the way for automation;
f) ensure that metadata are recorded at the time they are created, preferably automatically as a by-product of the processes that generate them, rather than manually and long afterwards;
g) ensure that there is a single copy of each metadata value, which is entered once and can be accessed or superseded, but not overwritten, earlier values being retained to allow historical access;
h) enable different views of metadata corresponding to the differing needs of the various users; and
i) reuse metadata wherever possible rather than recreating them.

3.2. MANAGE DATA AND ICT SYSTEMS

SCOPE

The aim is to use UNCTAD infrastructure to the extent possible in managing data and systems.

Where data repositories or systems have to be purpose built for the process, the activities in this group are aimed at ensuring that an informed choice is made of systems unit or contractor responsible for application development and support, that the platform where the data are stored and on which applications run is appropriate, that systems needs are well defined and conveyed to the systems unit or contractor, that tools, databases and other applications are tested before being put into production, that problems with the systems are recorded, communicated to the systems unit or contractor, and corrected.

GENERAL GUIDELINES

UNCTAD should:

a) map and document the sequence(s) of activities constituting each phase of the process, and determine the potential for their automation;

b) ensure that systems' needs are well defined and conveyed to the systems unit or contractor;

c) ensure that all systems are tested before being put into production; and

d) ensure that any systems problems are recorded, communicated to the systems unit or contractor and corrected.

3.3. ASSURE PROFESSIONAL INDEPENDENCE AND IMPARTIALITY

SCOPE

The statistical activities in this group aim at ensuring that the manner in which UNCTAD collects, produces and disseminates statistics is professional independent, objective and impartial, and is seen to be so. Activities include: demonstrating the commitment to follow international standards and best practices; publicising the methods used; ensuring that statistics are determined by statistical considerations and not by pressure from providers or users; and explaining major changes in methodology to users.

GENERAL GUIDELINES

UNCTAD should:

a) make known its commitment to follow professional standards in collecting, producing and disseminating statistics that are objective and impartial, including by publicizing its statistics quality assurance framework;

b) develop and made public its statistics dissemination policy;

c) develop and made public its release calendar in which dissemination dates and times are pre-announced, and ensure that any subsequent deviations from the calendar are announced and justified to the users;

d) ensure that statistics are produced on an objective basis, determined only by statistical considerations;

e) select sources, concepts, methods, processes and dissemination practices on the basis of statistical considerations, using national and international principles and best practices;

f) explain major changes in methods and data revisions to users;

g) ensure that statistical releases are clearly distinguished from political/policy statements and issued separately from them;

h) ensure that statistical releases and statements made at press conferences are objective and non-partisan; and

i) correct errors in statistical outputs as soon as possible after they are detected, and inform users.

3.4. MANAGE QUALITY AND PERFORMANCE AND COORDINATE

SCOPE

There are three goals for the activities in this group. The first is to ensure that a statistics quality assurance framework is in place and that quality and performance are monitored and assured throughout the production process. The second is to ensure that UNCTAD is well organised and operates efficiently, and that the human and financial resources available are adequate in magnitude and quality for effective conduct of the production process. The third is to ensure that, to the extent possible, statistical activities are coordinated across UNCTAD as a whole.

GENERAL GUIDELINES

As regards quality assurance UNCTAD unit should:

a) adopt a statistics quality assurance framework, including quality principles, definitions, guidelines and a quality assessment checklist;

b) ensure quality and performance are monitored during most, if not all, sub-processes in all phases of the process;

c) introduce quality gates at key points in the process to eliminate, or at least substantially reduce, the incidence of errors in disseminated data; quality gates are (usually manual) check points at which specified quality criteria must be specified before the next stage of processing is allowed to take place;

d) periodically, or the case of severe persistent problems, commission an external quality evaluation of the production process and products and supporting infrastructure; this includes setting the objectives and scale of the evaluation, providing the evaluation team with comprehensive documentation and reviewing and discussing the evaluation results;

e) based on the results of quality monitoring, assessment or evaluation results, identify and implement quality and performance improvements; and

f) prepare a business case for quality improvements that require additional resources and submit to senior management.

As regards performance management, UNCTAD should:
a) measure and analyse the work effort involved in each phase of the production process;
b) organise work flows efficiently to minimize the human resources required;
c) ensure good communication channels within the statistical unit and between statistical compilers and data providers, users and stakeholders;
d) ensure that statistical activities and outputs have high profile with senior management of UNCTAD;
e) ensure user feedback is taken into account in determining priorities when resources are limited;
f) advise senior management when the financial and human resources available do not match the statistical activities envisaged; and
g) prepare a business case to support any request for additional resources.

As regards statistical coordination, UNCTAD should:
a) designate GDGS/DSIB as having responsibility for statistical coordination in UNCTAD;
b) develop and adopt a SQAF and ensure it is implemented.

DSIB should:
a) identify the statistical production processes in UNCTAD;
b) ensure the staff involved in these processes receive SQAF training;
c) ensure that all processes are subject to a quality assessment in accordance with the SQAF assessment programme and that action is taken on the recommendations.
d) ensure there are tools to support use of standard concepts, definitions and classifications;
e) ensure there are tools to facilitate making data produced by UNCTAD readily available to other organisational units in UNCTAD;
f) ensure there is a single conduit for acquisition of data from each other international organisation so that data from this organisation are consistently used within UNCTAD; and
g) ensure that staff in UNCTAD unit use data produced by other units in UNCTAD in preference to data on the same topic produced by another international organisation.