# Introduction to Quality Assessment

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***Component 3: Quality and metadata***

***Activity 3.9: Quality Audit – I***

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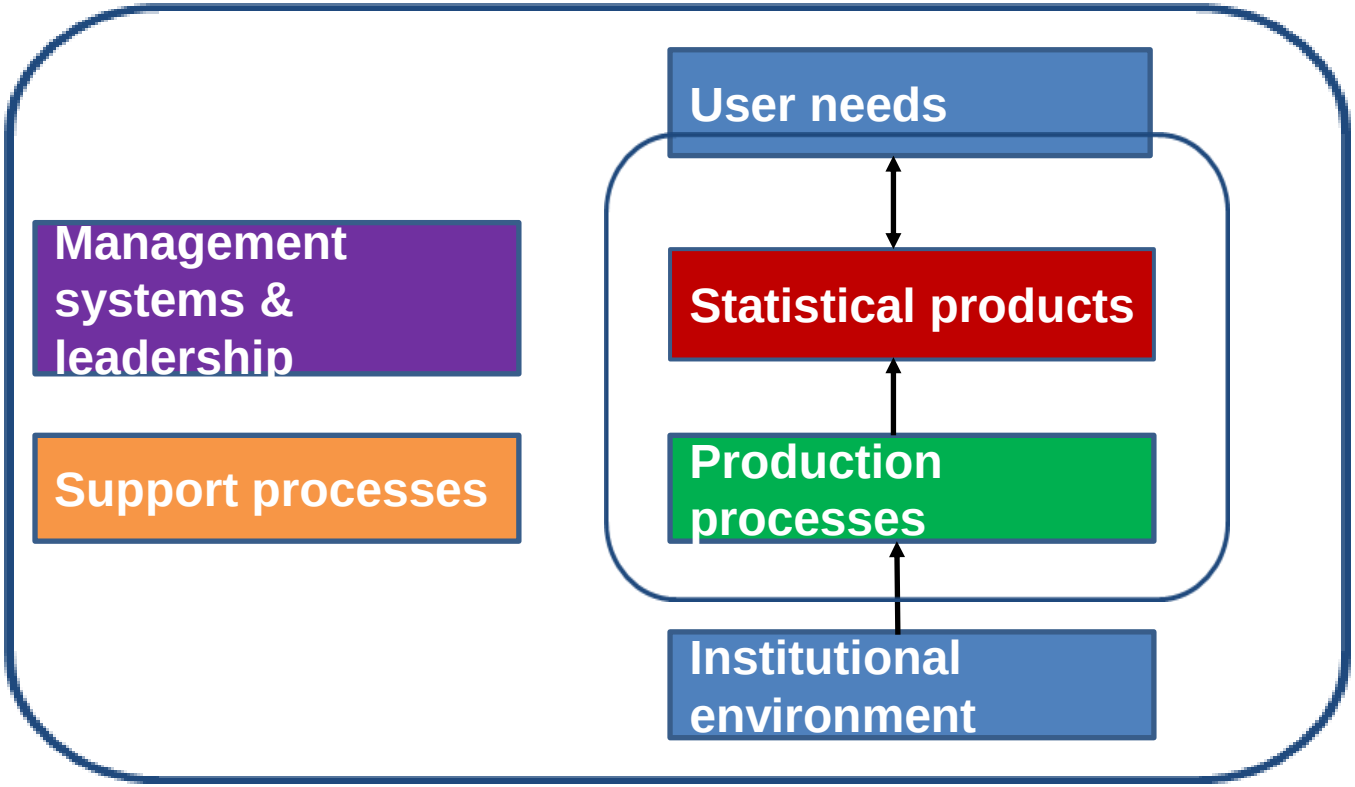
## Quality assessment

**Assessment**

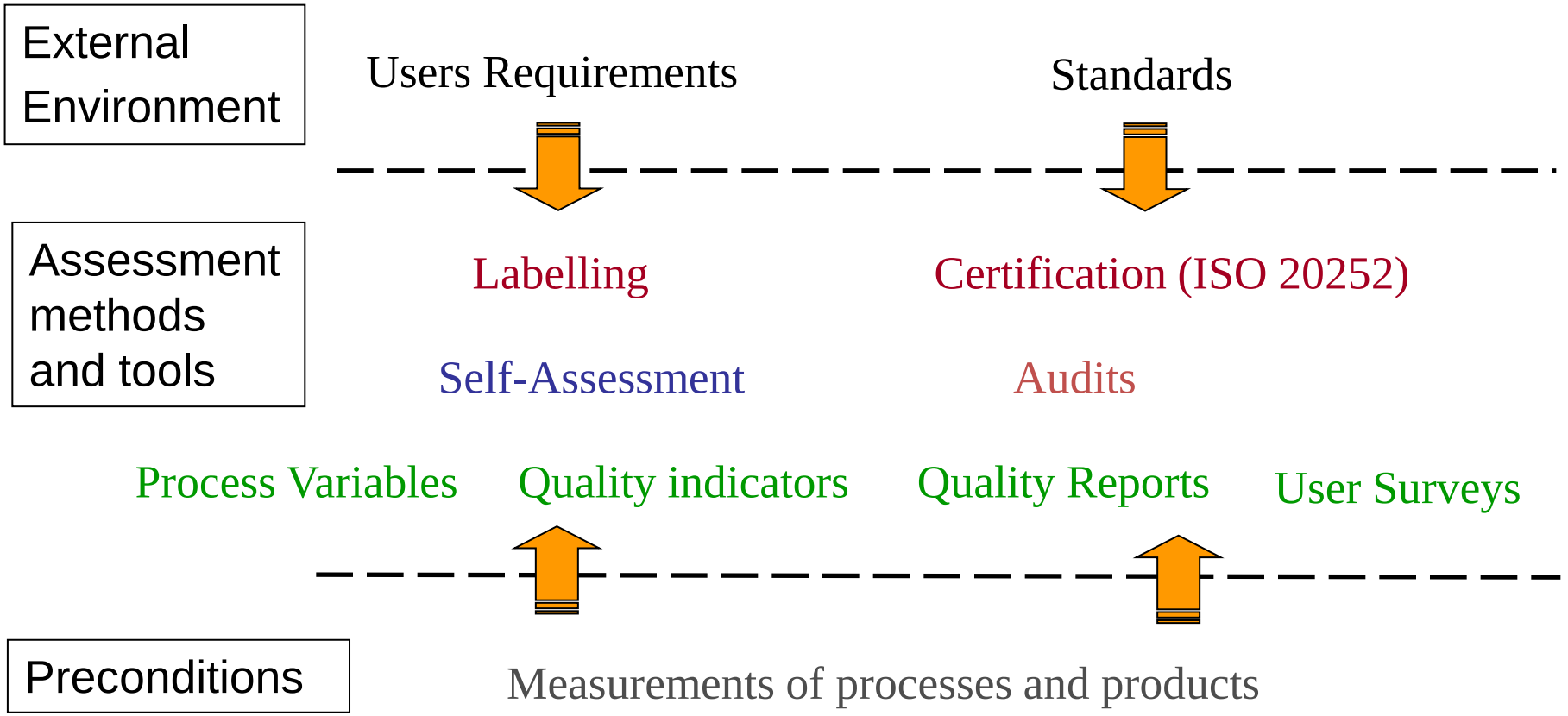
- Institution
- Statistical products and processes

## Elements of a quality management system*




*Bergdahl et al. (2007) Handbook on DatQAM

## Data quality assessment map*




*Bergdahl et al. (2007) Handbook on DatQAM

# External environment

## Users requirements

- Users have a key role in quality definition
- Tools to guarantee users requirements: users-producers dialogue, users satisfaction evaluation
- Quality components and the view on quality from the users

## Standards

Examples of standards

- Quality guidelines
- Minimum standards
- International Organization for Standardization (ISO) norms
- Recommended practices

## First level of assessment

**Key process variables**

Key process variables are those factors that can vary with each repetition of the process and have the largest effect on critical product characteristics, i.e. those characteristics that best indicate the quality of the product (Jones and Lewis, 2003).

- Quantitative indicators useful to monitor processes over time, identify sources of errors and improve process quality
- The approach works better for standardized processes
- Examples: nonresponse indicators, performance indicators computed for interviewers

## First level of assessment

**Quality indicators**

Quality indicators are statistical measures that give an indication of output quality. Examples are estimated standard errors and response rates, which relate specifically to the accuracy of the output. Quality indicators differ from process variables, which give an indication of the quality of the process. However, some quality indicators can also give an indication of process quality. Response rates are an example of this (Jones and Lewis, 2003).

- product/output quality measures
- process indicators
- areas may overlap

## First level of assessment

### Users surveys

- Type of surveys:
  - General directed to known users
  - Image studies on “confidence” directed to unknown users
  - Specific surveys on product/services to target groups

- Users satisfaction surveys have methodological limitations:
  - lists of users are not available
  - satisfaction is difficult to measure
  - results are difficult to turn into useful improvement activities

## First level of assessment

**Quality reporting**

A quality report provides information on the main quality characteristics of a product so that the *user* should be able to assess product quality. In the optimal case quality reports are based on quality indicators (Bergdahl et al., 2007)

### Main features of a quality report:

- Object: a statistical product or statistical process
- Target recipients: users or producers of official statistics
- Purposes: to accompany official statistics dissemination, to support quality assessment
- Contents: quality dimensions, quality indicators
- Further characteristics: standard structure, different levels of detail tailored on recipient and purpose

## ESS quality reporting standards

**Single Integrated Metadata Structure (SIMS)**

SIMS is a dynamic inventory of ESS quality and metadata concepts.

The 2 ESS standard structures for metadata and quality reporting
ESMS and ESQRS have been mapped and merged creating a unique structure.

- Euro SDMX Metadata Structure (ESMS) – 2009
- ESS Standard for Quality Reports Structure (ESQRS) – 2010

ESMS is considered user oriented and ESQRS producer oriented.

## ESS quality reporting standards

### Definition of reference metadata

Metadata describing the contents and the quality of the statistical data.

Preferably, reference metadata should include all of the following:

a) "conceptual" metadata, describing the concepts used and their practical implementation, allowing users to understand what the statistics are measuring and, thus, their fitness for use;
b) "methodological" metadata, describing methods used for the generation of the data (e.g. sampling, collection methods, editing processes);
c) "quality" metadata, describing the different quality dimensions of the resulting statistics (e.g. timeliness, accuracy).

## ESS quality reporting standards

- Euro SDMX Metadata Structure (ESMS) – 2009

  Commission Recommendation of 23 June 2009 on reference metadata for the European Statistical System:

  ESMS is to be used by NSIs when compiling reference metadata in the different statistical areas and exchanging them within the European Statistical System or beyond.

- ESS Standard for Quality Reports Structure (ESQRS) – 2010

  ESS Handbook for Quality Reports 2014

  Guidelines for the preparation of comprehensive quality reports for a full range of statistical processes and their outputs.

# Euro SDMX Metadata Structure (ESMS)

| | Concept Name |
|---|---|
| **1** | **Contact** |
| 1.1 | Contact organisation |
| 1.2 | Contact organisation unit |
| 1.3 | Contact name |
| 1.4 | Contact person function |
| 1.5 | Contact mail address |
| 1.6 | Contact email address |
| 1.7 | Contact phone number |
| 1.8 | Contact fax number |
| **2** | **Metadata update** |
| 2.1 | Metadata last certified |
| 2.2 | Metadata last posted |
| 2.3 | Metadata last update |
| **3** | **Statistical presentation** |
| 3.1 | Data description |
| 3.2 | Classification system |
| 3.3 | Sector coverage |
| 3.4 | Statistical concepts and definitions |
| 3.5 | Statistical unit |
| 3.6 | Statistical population |
| 3.7 | Reference area |
| 3.8 | Time coverage |
| 3.9 | Base period |
| **4** | **Unit of measure** |
| **5** | **Reference period** |
| **6** | **Institutional mandate** |
| 6.1 | Legal acts and other agreements |
| 6.2 | Data sharing |

| | Concept Name |
|---|---|
| **7** | **Confidentiality** |
| 7.1 | Confidentiality - policy |
| 7.2 | Confidentiality - data treatment |
| **8** | **Release policy** |
| 8.1 | Release calendar |
| 8.2 | Release calendar access |
| 8.3 | User access |
| **9** | **Frequency of dissemination** |
| **10** | **Dissemination format** |
| 10.1 | News release |
| 10.2 | Publications |
| 10.3 | On-line database |
| 10.4 | Micro-data access |
| 10.5 | Other |
| **11** | **Accessibility of documentation** |
| 11.1 | Documentation on methodology |
| 11.2 | Quality documentation |
| **12** | **Quality management** |
| 12.1 | Quality assurance |
| 12.2 | Quality assessment |
| **13** | **Relevance** |
| 13.1 | User needs |
| 13.2 | User satisfaction |
| 13.3 | Completeness |
| **14** | **Accuracy and reliability** |
| 14.1 | Overall accuracy |
| 14.2 | Sampling error |
| 14.3 | Non-sampling error |

| | Concept Name |
|---|---|
| **15** | **Timeliness and punctuality** |
| 15.1 | Timeliness |
| 15.2 | Punctuality |
| **16** | **Comparability** |
| 16.1 | Comparability - geographical |
| 16.2 | Comparability - over time |
| **17** | **Coherence** |
| 17.1 | Coherence - cross domain |
| 17.2 | Coherence - internal |
| **18** | **Cost and burden** |
| **19** | **Data revision** |
| 19.1 | Data revision - policy |
| 19.2 | Data revision - practice |
| **20** | **Statistical processing** |
| 20.1 | Source data |
| 20.2 | Frequency of data collection |
| 20.3 | Data collection |
| 20.4 | Data validation |
| 20.5 | Data compilation |
| 20.6 | Adjustment |
| **21** | **Comment** |

Example

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# ESS Standard for Quality Reports Structure (ESQRS)

| | Concepts |
|---|---|
| **I** | **Contact** |
| I.1 | Contact organisation |
| I.2 | Contact organisation unit |
| I.3 | Contact name |
| I.4 | Contact person function |
| I.5 | Contact mail address |
| I.6 | Contact email address |
| I.7 | Contact phone number |
| I.8 | Contact fax number |
| **II** | **Introduction** |
| **III** | **Quality assessment** |
| **IV** | **Relevance** |
| IV.1 | User needs |
| IV.2 | User satisfaction |
| IV.3 | Completeness |
| IV.3.1 | Data completeness – rate |
| **V** | **Accuracy and reliability** |
| V.1 | Overall accuracy |
| V.2 | Sampling error |
| V.2.1 | Sampling error - indicators |
| V.3 | Non-sampling error |
| V.3.1 | Coverage error |
| V.3.1.1 | Over-coverage - rate |
| V.3.2 | Measurement error |
| V.3.3 | Non response error |
| V.3.3.1 | Unit non-response - rate |
| V.3.3.2 | Item non-response - rate |

| | Concepts |
|---|---|
| V.3.4 | Processing error |
| V.3.4.1 | Imputation - rate |
| V.3.4.2 | Common units - proportion |
| V.3.5 | Model assumption error |
| V.3.6 | Data revision |
| V.3.6.1 | Data revision – policy |
| V.3.6.2 | Data revision - practice |
| V.3.6.3 | Data revision – average size |
| V.3.7 | Seasonal adjustment |
| **VI** | **Timeliness and punctuality** |
| VI.1 | Timeliness |
| VI.1.1 | Time lag – first result |
| VI.1.2 | Time lag – final result |
| VI.2 | Punctuality |
| VI.2.1 | Punctuality – delivery and publication |
| **VII** | **Accessibility and clarity** |
| VII.1 | News release |
| VII.2 | Publication |
| VII.3 | On-line database |
| VII.3.1 | Data tables –consultations |
| VII.4 | Micro-data access |
| VII.5 | Other |
| VII.5.1 | Metadata –consultations |
| VII.6 | Documentation on methodology |
| VII.6.1 | Metadata completeness – rate |
| VII.7 | Quality documentation |

| | Concepts |
|---|---|
| **VIII** | **Comparability** |
| VIII.1 | Comparability – geographical |
| VIII.1.1 | Asymmetry for mirror flows statistics - coefficient |
| VIII.2 | Comparability – over time |
| VIII.2.1 | Length of comparable time series |
| VIII.3 | Comparability – domain |
| **IX** | **Coherence** |
| IX.1 | Coherence- cross domain |
| IX.1.1 | Coherence – sub annual and annual statistics |
| IX.1.2 | Coherence- National Accounts |
| IX.2 | Coherence – internal |
| **X** | **Cost and Burden** |
| **XI** | **Confidentiality** |
| XI.I | Confidentiality – policy |
| XI.2 | Confidentiality – data treatment |
| **XII** | **Statistical processing** |
| XII.1 | Source data |
| XII.2 | Frequency of data collection |
| XII.3 | Data collection |
| XII.4 | Data validation |
| XII.5 | Data compilation |
| XII.6 | Adjustment |
| **XIII** | **Comment** |

Example

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## ESS quality reporting standards

**Single Integrated Metadata Structure**

SIMS is a dynamic inventory of ESS quality and metadata concepts.
The 2 standard metadata structures ESMS and ESQRS have been mapped and merged creating a unique structure based on the following principles:

- **All** the **concepts** in the existing metadata and quality report structures are **included**;
- The statistical concepts appear **only once**;
- The same concept names and the same quality indicators are always used in the different metadata and quality report structures;
- The descriptions and the **guidelines** for the compilation of the concepts and sub-concepts have been reviewed and **harmonised**

## ESS quality reporting standards

**ESS Handbook for Quality Reports 2014**

- Updated version of 2009 ESS Handbook for Quality Reports

  Examples updated

  Indicators harmonised to ESS Quality and Performance Indicators (QPI)

  Structure harmonised with ESQRS metadata structure

  Updated version of 2009 ESS Handbook for Quality Reports
- Includes the ESS QPI and the technical manual of the Single Integrated Metadata Structure (annexes)
- It should be considered an intermediate version

## Second level of quality assessment

**Self-assessment**
It can be applied at institution or at program/process level

Comprehensive, systematic and regular review of activities and results against a reference model/framework

- «Do it yourself» evaluation, subjective
- More general, not based on quantitative measures
- It does not require extensive production of ad hoc documentation
- Based on the compilation of check-list or questionnaires
- It stimulates the quality awareness and continuous improvement

## Self Assessment Checklist for Survey Managers (DESAP)

- generic checklist for a systematic quality assessment of surveys in the European Statistical System (ESS)
- tool to support survey managers in assessing the quality of their statistics and in identifying improvement measures
- fully compliant with the ESS quality criteria
- comprises the main aspects relevant to the quality of statistical data
- two versions: long and condensed

## Second level of quality assessment

### Statistical auditing

Systematic, independent and documented process for obtaining verifiable evidence and evaluating it objectively to determine the extent to which the **audit criteria** (policies, procedures or requirements) are fulfilled

- External or internal auditors (external to the audited process): they should be recognised as EXPERTS
- Importance of communication
- It may require the compilation of reports, computation of quality indicators, preparation of ad hoc documentation
- It may use supporting questionnaires
- It results in the identification of strength and weaknesses of the process, and definition of improvement actions with a time scheduling for their implementation

## Second level of quality assessment

**Peer review**

Systematic examination and assessment of the performance of a statistical agency by other statistical agencies, with the objective of helping the reviewed institution to improve its quality policy, adopt best practices and comply with given standards and principles

- More informal and less structured respect to auditing
- May require to have extensive documentation at hand
- Generally oriented to assess at high level of the institution
- Usually it produces recommendations and an implementation programme

## Third level of quality assessment

### Labelling

It consists on the assignment of an attribute (short message) conferring a quality connotation to the product/service, based on a procedure to evaluate compliance to *ex-ante* (before statistics are produced) or *ex-post* (after statistics are produced) standards or requirements.

In official statistics field, the message is usually referred to the product or to the producer

- Need for careful selection of the message
- Need for existence of a procedure to guarantee the message is appropriate
- It provides guarantees on the product/service
- It increases the producer's authoritativeness

Example of labels

"Official statistics"; "European statistics"

## Third level of quality assessment

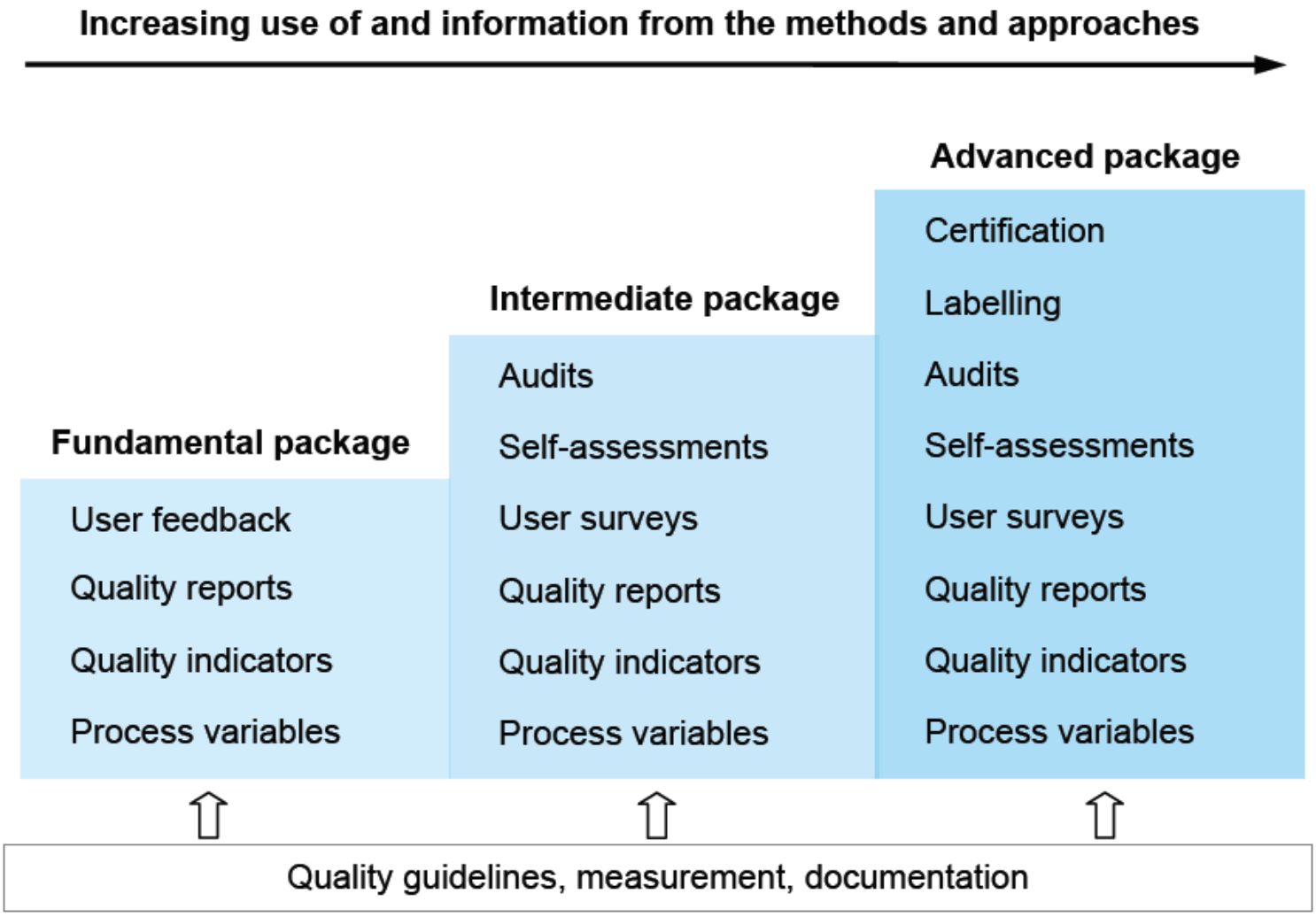
### Certification

Method aimed at certifying the compliance to a international standard combining the external audit approach with the labelling one

ISO 20252:2006 *Market, opinion and social research* is an international standard on quality of data in the sector of the marketing, opinion and social research studies

- It requires the adoption of a quality management system
- It is a very transparent system
- It may increase the Institution credibility
- Usually, it requires the production of extensive documentation
- It increases the awareness on process quality and it stimulates the quality improvement

**Figure 7: The packages of DatQAM implementation**



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