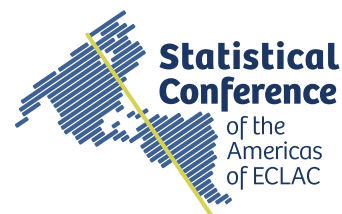


Guide for the implementation
of a quality assurance
framework for statistical
processes and outputs



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Guide for the implementation
of a quality assurance
framework for statistical
processes and outputs



UNITED NATIONS



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- Cuba: National Office of Statistics and Information (ONEI)
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- Ecuador: National Institute of Statistics and Censuses (INEC)
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Contents

Introduction.....	7
Chapter I	
The context of quality assurance.....	9
A. The United Nations National Quality Assurance Frameworks Manual for Official Statistics.....	9
1. Level A: Managing the statistical system.....	10
2. Level B: Managing the institutional environment.....	11
3. Level C: Managing statistical processes.....	12
4. Level D: Managing statistical outputs.....	12
B. The concept of quality.....	13
C. Quality in the data ecosystem.....	14
Chapter II	
Actions to strengthen statistical quality assurance in the region.....	17
A. Diagnosing with the self-assessment checklist.....	17
1. Main findings of the pilot test.....	19
B. Linking risk management with statistical quality assurance.....	20
C. Use of standards.....	22
1. The United Nations National Quality Assurance Framework and Fundamental Principles of Official Statistics.....	23
2. The Generic Statistical Business Process Model (GSBPM).....	23
3. Catalogues, classifications and good practices.....	23
4. Metadata of publicly available information.....	23
5. Internal metadata for statistics production.....	24
6. Standards for mainstreaming the gender perspective in the statistical process.....	24
D. Considerations regarding new data sources and the Sustainable Development Goals.....	25
Chapter III	
Best practices in the region for compliance with the principles of levels C and D of the National Quality Assurance Framework (principles 10 to 19).....	27
Chapter IV	
Considerations for implementing a quality framework.....	33
A. Establishing a baseline in terms of compliance with quality principles.....	33
B. Designing the statistical process.....	33
C. Making the best use of administrative records for statistical purposes.....	35
D. Seeking measurement modalities based on the dimensions of quality and stages of the statistical process.....	36
E. Having a risk management plan.....	37
F. Documenting the National Statistical Quality Assurance Framework.....	38
G. Defining the data ecosystem of the country's official statistics.....	39
Bibliography.....	41
Annexes.....	43

Tables

II.1	Number of requirements and elements in the adapted self-assessment checklist.....	18
III.1	Summary of good practices in the region for complying with the principles of levels C and D of the National Quality Assurance Framework (principles 10 to 19).....	28
A1.1	Level A: Managing the statistical system.....	44
A1.2	Level B: Managing the institutional environment.....	45
A1.3	Level C: Managing statistical processes.....	47
A1.4	Level D: Managing statistical outputs.....	50

Figure

II.1	Average and distribution of regional scores for each of the United Nations National Quality Assurance Framework quality principles.....	19
------	---	----

Box

II.1	Risk management during the coronavirus disease (COVID-19) pandemic.....	21
------	---	----

Diagrams

I.1	Level A: Managing the statistical system.....	11
I.2	Level B: Managing the institutional environment.....	11
I.3	Level C: Managing statistical processes.....	12
I.4	Level D: Managing statistical outputs.....	13

Introduction

This document is intended as a guide to the adoption, adaptation and application in Latin America and the Caribbean of the United Nations National Quality Assurance Frameworks Manual for Official Statistics (United Nations, 2019). It draws on the Manual and its diagnostic tools via an unofficial Spanish translation produced by the national statistical offices of Colombia and Mexico.¹ It also draws on discussions of those inputs held with the countries of the region to obtain recommendations for adapting the Manual to the Latin American and Caribbean context.²

This guide aims to provide inputs and tools for use by the region's countries in formulating and implementing their own national quality frameworks and improving existing ones. It is divided into four chapters. The first contextualizes statistical quality assurance and provides a brief summary of the United Nations National Quality Assurance Frameworks Manual for Official Statistics as an essential benchmark for those venturing into quality assurance; presents the concept of statistical quality developed on the basis of the experiences of the Latin American and Caribbean countries; and introduces the concept of the data ecosystem in the quality assurance framework in relation to the opportunities arising from digital transformation and the proliferation of new data sources.

The second chapter makes recommendations for actions to develop, implement and strengthen statistical quality assurance in the region. These include implementation of a diagnosis using a self-assessment checklist, the importance of risk management to statistical quality assurance, and the application of standards and considerations relating to new data sources and the Sustainable Development Goals (SDGs).

The third chapter presents best practices, including any tools and indicators that have been used in the region to implement statistical quality assurance.

The fourth chapter draws on the information contained in the previous chapters to recapitulate the steps to be followed in order to begin implementing a statistical quality assurance framework in the region's countries, starting from the most technical levels.

This guide also has three annexes. Annex 1 details the requirements and elements included in the adapted version of the self-assessment checklist for statistical quality in the region. Annex 2 contains the instructions for completing the self-assessment checklist for statistical quality in the region, which provides a basis on which the countries can establish a national quality assurance framework. Annex 3 is a glossary of terms that unifies the language and concepts of the guide to facilitate understanding and application of it.

The self-assessment checklist, which contains the principles, requirements and elements specified in annex 1, is presented in an Excel file that allows each country to apply the quality principles by automatically assessing the elements to be assured. This file can be accessed at the following link: <https://rtc-cea.cepal.org/es/herramientas-metodologicas/cuestionario-de-autoevaluacion-de-la-gestion-de-los-sistemas>.

¹ The translation was carried out in the course of the participation by Colombia and Mexico in the United Nations Expert Group on National Quality Assurance Frameworks.

² A pilot test of the diagnostic instrument (the checklist) adapted to the regional context was conducted, focusing on the quality of the statistical processes and outputs that are the focus of this guide.

Chapter I

The context of quality assurance

This first chapter discusses the conceptual framework and definitions that must be considered when implementing a statistical quality assurance framework. It first provides a summary of the United Nations National Quality Assurance Frameworks Manual for Official Statistics, explaining the dimensions of quality and the principles associated with each of them. The Manual is an important reference source in any effort to create a comprehensive statistical quality assurance framework since, with its focus on statistical processes and outputs, it is considered to have an essential role to play in explaining and supplementing the contents of this guide.

The chapter then looks at the concept of statistical quality, matching it to the regional context, and establishes a definition based on the Manual and adopted by the countries of the region. Lastly, it discusses the advantages offered to the region by a new, digitally transformed data ecosystem that uses emerging data sources to produce more disaggregated data in a timely and reliable manner, while also making it possible to reimagine how national statistical offices can contribute to quality assurance in the new environment.

A. The United Nations National Quality Assurance Frameworks Manual for Official Statistics

Quality management frameworks provide a coherent, holistic system as a basis for quality management. Specifically in the field of statistics, there are frameworks such as the European Statistics Code of Practice, the International Monetary Fund (IMF) Data Quality Assessment Framework, the Organisation for Economic Co-operation and Development (OECD) Recommendation of the OECD Council on Good Statistical Practice and the United Nations National Quality Assurance Framework.

The National Quality Assurance Frameworks Manual provides a guide that focuses primarily on quality assurance with a view to ensuring that official statistics are a reliable source of information in a changing environment. The first chapter of the United Nations National Quality Assurance Frameworks Manual for Official Statistics contains a description of its purpose, structure, users and uses. It also provides a basic introduction to data quality management and defines some key concepts necessary to understand its contents.

The second chapter contains the United Nations recommendations for ensuring the availability and quality of official statistics produced by members of the national statistical system (NSS). In specific cases, however, the recommendations can be adopted by other members of the extended data ecosystem that are not part of the NSS and that produce non-official statistics. These include international and supranational organizations, firms that produce data on a regional or global scale, and private or public-private professional organizations, among others.

The United Nations National Quality Assurance Frameworks Manual for Official Statistics sets out five core general recommendations and nine specific recommendations for implementing the Fundamental Principles of Official Statistics. The five core general recommendations are mainly based on Principle 1, which states that official statistics should meet the test of practical utility, putting users at the centre (United Nations, 2019):

- (i) It is recommended that, in order to be effective, the fundamental values and principles that govern the development, production and dissemination of official statistics be guaranteed by legal and institutional frameworks and be respected at all political levels and by all stakeholders in national statistical systems.
- (ii) It is recommended that countries include the requirements of quality assurance in their national statistical legislation and other legislation mandating the production of statistics for official use.

- (iii) It is recommended that countries establish a national quality assurance framework for official statistics and that all members of the national statistical system commit to continually assessing, improving and reporting on the quality of official statistics, as well as on the quality of data and statistics used in the production of official statistics as required.
- (iv) It is recommended that the national quality assurance framework for official statistics be developed in consideration or in alignment with the United Nations National Quality Assurance Framework or similar existing quality assurance frameworks.
- (v) It is recommended that the national quality assurance framework be implemented at the national statistical office and throughout the entire national statistical system. Furthermore, it is recommended that the national quality assurance framework be applied to all data and statistics produced outside of the national statistical system that are disseminated with the help and support of a member of the national statistical system or that are used for government decision-making, as deemed appropriate and required.

The third chapter of the National Quality Assurance Frameworks Manual for Official Statistics introduces the United Nations National Quality Assurance Framework, whose quality framework principles and associated requirements are organized into the following levels:

Level A: Managing the statistical system.

Level B: Managing the institutional environment.

Level C: Managing statistical processes.

Level D: Managing statistical outputs.

Each level includes a set of principles and quality requirements related to the Fundamental Principles of Official Statistics endorsed by the Member States of the United Nations and necessary for quality assurance in statistical production. These requirements are vital indicators whose fulfilment guarantees that measures have been taken to ensure statistical quality.

1. Level A: Managing the statistical system

This level refers to the coordination that should exist among the statistical agencies and units making up the NSS, to ensure: (i) quality assurance and efficiency in the production of official statistics and (ii) the use of common statistical standards throughout the system.

For this, it is deemed necessary to coordinate the work of NSS members through the adoption of a statistics law establishing their responsibilities. It is also considered essential to design a national programme for the development and production of official statistics to coordinate NSS activities at the local, national, regional and international levels.

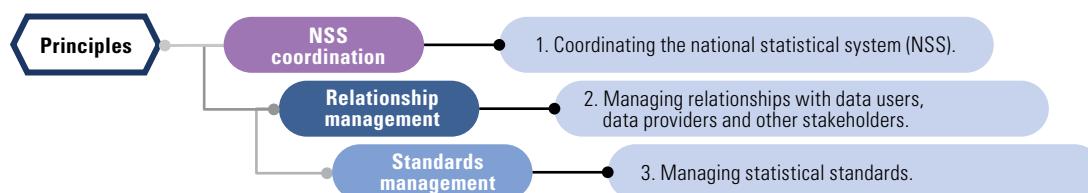
Similarly, statistical offices must build and maintain good relationships with all key actors in the system (users, data providers, funding institutions, senior government officials, major community organizations, academia and the media). All statistical offices must have access to the data required to meet the information needs of society effectively and efficiently, and standards incorporating the definitions, classifications, concepts, models, methods and statistical procedures necessary to achieve uniform treatment of statistical needs across temporal and geographical dimensions have to be created.

There is a direct relationship between the fundamental principles of official statistics and the quality principles. For each level of the National Quality Assurance Frameworks Manual for official statistics, different fundamental principles and quality principles are associated.

The fundamental principles in the management of the statistical system are coordination of the national statistical system, relationship management and standards management, in addition to the quality principles (see diagram I.1).

Diagram I.1

Level A: Managing the statistical system



Source: Prepared by the authors, on the basis of United Nations, “United Nations National Quality Assurance Frameworks Manual for Official Statistics: Including recommendations, the framework and implementation guidance”, Studies in Methods, series M, No. 100 (ST/ESA/STAT/SER.M/100), New York, 2019.

2. Level B: Managing the institutional environment

To ensure that official statistics are credible, statistical offices must be able to develop, produce and disseminate statistics without any political interference or social pressure such as might be exerted by other governmental, regulatory or standard-setting agencies or by certain members of the private sector, or any other outside interference.

Professional independence and the absence of inappropriate influences are decisive factors that can contribute significantly to the creation of a favourable perception regarding the credibility, impartiality and objectivity of measurements. It is thus considered desirable for there to be a law or statutory provision stipulating that statistical offices should develop, produce and disseminate statistics to professional standards and give equal importance to all users. Statistical offices should also have the legal authority they need to obtain administrative data and should ensure that other government agencies have access to data for statistical purposes.

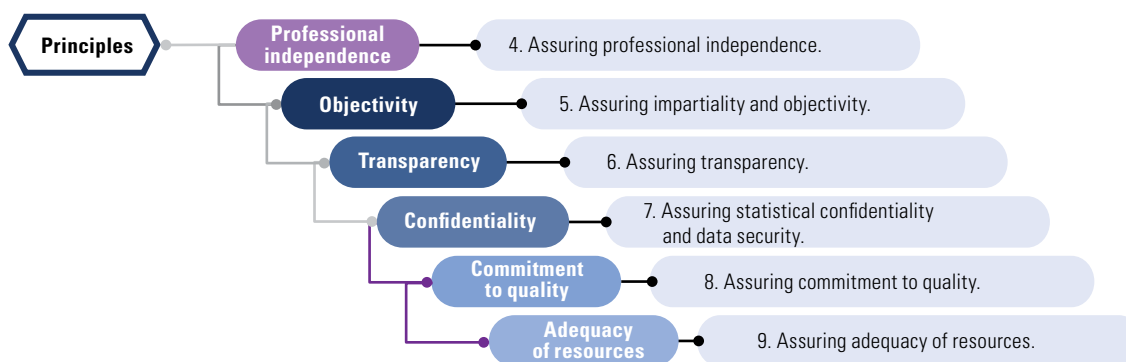
To achieve this, it is essential for data sources and statistical methodologies to be selected objectively, for release dates and times to be announced in advance, and for errors to be corrected as soon as possible. Users should be told how such errors have affected the published statistics so that they can mitigate the risk of misuse of official statistics and avoid misinterpretations. With regard to ensuring transparency, it is mandated that NSS members should publicize their operating policies and practices.

Statistical offices should also focus on ensuring the quality of statistical work, securing the resources needed for this purpose and regularly and systematically identifying their weaknesses in order to continuously improve process and product quality, while safeguarding statistical confidentiality and data security.

The fundamental principles when it comes to management of the institutional environment are professional independence, objectivity, transparency, confidentiality, commitment to quality and adequacy of resources, in addition to the quality principles (see diagram I.2).

Diagram I.2

Level B: Managing the institutional environment



Source: Prepared by the authors, on the basis of United Nations, “United Nations National Quality Assurance Frameworks Manual for Official Statistics: Including recommendations, the framework and implementation guidance”, Studies in Methods, series M, No. 100 (ST/ESA/STAT/SER.M/100), New York, 2019.

3. Level C: Managing statistical processes

Where management of statistical processes is concerned, there is expected to be full compliance with international standards, guidelines and good practices issued by statistical agencies for the development, production and dissemination of official statistics.

In this way, the credibility of statistics will be reinforced by a good reputation for management and efficiency. Important principles that need to be adhered to for statistical processes to be properly managed relate to methodological soundness, cost-effectiveness, the application of appropriate statistical procedures and proper management of the respondent burden.

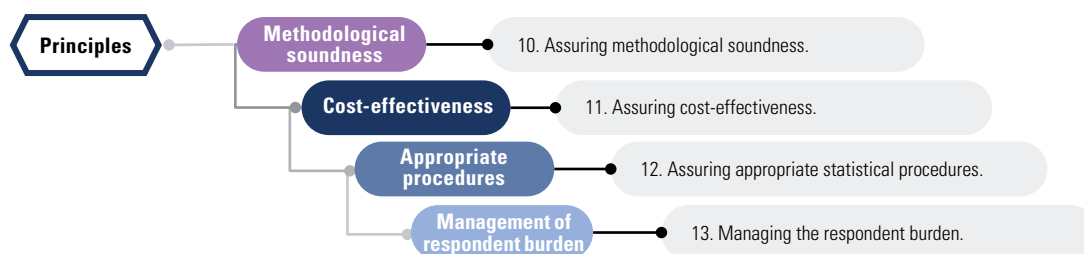
To this end, the methodologies applied by statistical agencies should be in line with international standards, guidelines and good practices, and should be regularly reviewed and updated as necessary. Statistical offices are also expected to cooperate with the scientific community to improve statistical methods and to pursue innovation in the development, production and dissemination of statistics.

Similarly, to ensure proper management of the statistical process, it is necessary to measure and analyse production costs individually with a view to cost minimization and resource efficiency. Provided that the need for continuity is regularly assessed for all statistics and procedures when allocating resources to improve the statistical potential of administrative records and other data sources, it will be possible to appropriately manage the cost-effectiveness of statistical processes. To this end, procedures should make effective use of administrative records and other data sources.

The fundamental principles in the management of the statistical process are methodological soundness, cost-effectiveness, appropriate procedures and management of the respondent burden, as well as the quality principles (see diagram I.3).

Diagram I.3

Level C: Managing statistical processes



Source: Prepared by the authors, on the basis of United Nations, "United Nations National Quality Assurance Frameworks Manual for Official Statistics: Including recommendations, the framework and implementation guidance", Studies in Methods, series M, No. 100 (ST/ESA/STAT/SER.M/100), New York, 2019.

4. Level D: Managing statistical outputs

Lastly, it is considered essential for statistics to meet the needs of national governments, research institutions, businesses, the general public and the international community. Statistical information must meet the needs and requirements of users. While relevance is a fundamental attribute of quality, it is subjective and depends on the different needs of users. Therefore, the main challenge for the statistical office is to weigh and balance the needs of both current users and those who may require its services in the future in order to produce statistics that meet the most important and highest-priority needs, given resource constraints.

Within this general framework, it is considered essential for statistics to be relevant, accurate, reliable, timely, punctual, readily accessible, clear, coherent and comparable across geographical regions and over time.

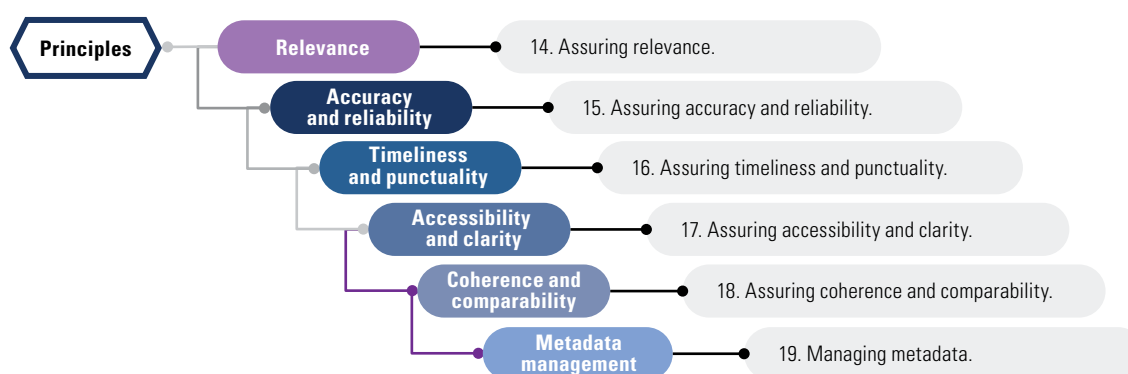
When statistical information is accurate, it can be used to form a correct view of the phenomena for which it was designed and to bring estimates closer to the true values of the phenomena to be measured. Likewise, establishing procedures and guidelines makes it possible to ensure internal, intersectoral and intrasectoral consistency, and thus to maintain the comparability of statistics between reasonable periods and geographical areas.

Lastly, it is considered essential for statistical agencies to provide concepts and definitions related to the data collected and statistics produced, the variables and classifications used and the data collection and processing methodologies employed, so that users can correctly understand all the attributes and limitations of statistics.

The fundamental principles in statistical output management are relevance, accuracy and reliability, timeliness and punctuality, accessibility and clarity, coherence and comparability, and metadata management, as well as the quality principles (see diagram I.4).

Diagram I.4

Level D: Managing statistical outputs



Source: Prepared by the authors, on the basis of United Nations, "United Nations National Quality Assurance Frameworks Manual for Official Statistics: Including recommendations, the framework and implementation guidance", *Studies in Methods*, series M, No. 100 (ST/ESA/STAT/SER.M/100), New York, 2019.

B. The concept of quality

The concept of statistical quality is present in the work of national statistical offices and is understood multidimensionally. Although the countries of Latin America and the Caribbean use different definitions of quality, these have common characteristics, such as user needs orientation and the obligation to meet a set of specifications or criteria.

Similarly, there are other international benchmarks that guide the definition of statistical quality. These include the United Nations Fundamental Principles of Official Statistics, which promote confidence in the integrity of statistical systems and foster credibility in the statistics produced by Member States.

It is important to note that quality assurance is operationalized in different dimensions: relevance, timeliness, accessibility, precision, comparability and credibility, among others. These dimensions must be suitably balanced so that the actions necessary to implement them contribute to the continuous improvement of statistical processes.

Based on the process of analysis and discussion of the National Quality Assurance Frameworks Manual and its diagnostic and application tools with the countries of Latin America and the Caribbean, a concept of statistical quality applicable to the region is presented. This specifies the criteria and characteristics that need to be met by the statistical process and outputs, which must be aimed at satisfying users' information needs.

This concept is materialized through the following dimensions:

- **Accessibility:** the ease with which the statistical information can be located and obtained by users. This includes the format in which the information is provided, the dissemination media and the availability of the metadata and the support services for consulting it.
- **Clarity:** the availability of appropriate documentation relating to the statistics and the additional assistance that the producers of information make available to users. Statistical methods and processes should be documented in such a way that they can be replicated.
- **Credibility:** the confidence that users have in the statistical outputs, based on the perception that they are produced professionally and according to appropriate statistical standards, and that policies and practices are transparent.

- Consistency: the degree to which the concepts used, the methodologies applied and the results produced by the operation are logically connected.
- Comparability: the characteristic that enables the results of different statistical operations to be related, aggregated and interpreted relative to one another or with respect to some common parameter.
- Timeliness: the length of time between the occurrence of the phenomenon under study and the publication of the statistics, such that they are useful for decision-making.
- Precision: the closeness of the estimates to the exact value of the phenomenon to be measured. Precision can be expressed in terms of standard deviation.
- Punctuality: the time lag between the release date set in the publication schedule and the actual delivery of the data.
- Relevance: the degree to which the statistics meet users' information needs.

C. Quality in the data ecosystem

In recent years, technological progress has led to the emergence of new data sources, new data providers and new producers of statistics. Additional demands for detailed and timely data for policymaking purposes have also arisen in the context of the implementation of the 2030 Agenda for Sustainable Development. This has led to the consolidation of a new data ecosystem, understood as a system in which a number of actors interact to exchange, produce and use data. Defined simply, a system can be understood as a set of connected parts that form a complex whole. However, there are many other definitions of a data ecosystem. The model used by the United Nations Development Programme (UNDP) considers the data ecosystem to consist of data producers, data objects, infomediaries (i.e., the media and other commercial information services) and data users (UNDP, 2017). Other models envisage the NSS as a system led by the national statistical office, situated at the centre of a system consisting of government agencies, academic and research institutions, the private sector, civil society and international and regional organizations (PARIS 21, n/d).

This new data ecosystem creates both challenges and opportunities for official statistics. For example, it is expected that the role of national statistical offices might change in the future, so that they come to play a progressively diminishing part in the production of official statistics, but an increasingly important one as managers of statistics and data produced by other agents. This guide aims to provide parameters and recommend actions to guarantee the quality of statistical processes and outputs, as a starting point for the development and implementation of a national framework for quality assurance whose purpose is to provide this assurance in different circumstances and situations, helping countries to safeguard the role of official statistics as a reliable source of information in a changing environment.

The new role of statistical offices should include promoting quality assurance frameworks not only among NSS institutions but also among different actors in the private sector that are generating more and more information. The following are some specific requirements included in the National Quality Assurance Framework questionnaire that ensure statistical quality at the data ecosystem level and that are of particular interest in the effort to prepare national statistical offices to achieve this goal (United Nations, 2019):

- Requirement 3.2: The national statistical office provides support and guidance to all data providers and producers of official statistics in the implementation of statistical standards.
- Requirement 8.2: The statistical agencies promote a culture of continuous improvement.
- Requirement 10.5: The statistical agencies cooperate with the scientific community to improve methods and promote innovation in the development, production and dissemination of statistics.
- Requirement 12.3: Procedures are in place to effectively use administrative and other data sources for statistical purposes.

- Requirement 13.2: Mechanisms are in place to promote the value and use of statistics to respondents.
- Requirement 13.4: Data sharing, data linkage and the use of administrative and other data sources are promoted to minimize respondent burden.
- Requirement 14.1: Procedures are in place to identify users and their needs and to consult them about the content of the statistical work programme.
- Requirement 14.2: Users' needs and requirements are balanced, prioritized and reflected in the work programme.
- Requirement 14.3: Statistics based on new and existing data sources are being developed in response to society's emerging information needs.
- Requirement 16.2: The relationship with data providers is managed with regard to timeliness and punctuality needs.
- Requirement 17.1: Statistics are presented in a form that facilitates proper interpretation and meaningful comparisons.
- Requirement 17.4: Access to microdata is allowed for research purposes, subject to specific rules and protocols on statistical confidentiality that are posted on the statistical agency's website.

A diagnostic assessment of the degree of maturity of national statistical offices in terms of these requirements will make it possible to guide them towards this possible new role. Chapter II presents additional aspects of statistical quality assurance for the information produced both at the national statistical office as the producer of official statistics and in the new data ecosystem.

Chapter II

Actions to strengthen statistical quality assurance in the region

Although this guide is based on the United Nations National Quality Assurance Frameworks Manual for Official Statistics, the idea is for implementation of the Manual to be adapted to the regional reality, pursuant to the discussions held within the Working Group. The first regional adaptation exercise involved the application of a diagnostic self-assessment checklist, proposed in the Manual as one of a number of quality assessment methods and tools.

Secondly, as the preparation of this guide coincided with the coronavirus disease (COVID-19) pandemic, and given the changing role of the statistical offices, emphasis was placed on incorporating risk management into the concept of statistical quality. In this process, the aim was to learn about and document the practices adopted in the countries of the region to maintain the quality of official statistics in the face of the challenges of the pandemic and in a context of high demand for information.

Thirdly, it addresses the need to adopt and adapt statistical quality standards. Various international organizations have promoted the adoption of norms that aim to standardize countries' statistical production, in order to achieve data comparability and interoperability. Accordingly, this guide includes the main standards used in the region, along with a number of actions that have contributed to their implementation in different countries.

Lastly, the National Quality Assurance Frameworks Manual for Official Statistics recognizes a new context of statistical production characterized by the appearance of new data sources and by the emergence of new information demands arising from the 2030 Agenda for Sustainable Development. It was considered essential to expand the traditional sources to which statistical offices have applied themselves thus far, in order to consider new sources of information and design appropriate strategies for processing this information, since although it has greater potential for disaggregation, it presents major challenges as regards the timeliness and reliability of statistics. This section includes the key issues to be considered when moving to take advantage of the quality of the information from these new data sources.

A. Diagnosing with the self-assessment checklist

The self-assessment checklist is primarily designed to evaluate the NSS, as viewed by the national statistical office in its capacity as the institutional coordinating body. The checklist was designed by the Expert Group on National Quality Assurance Frameworks and uses the United Nations National Quality Assurance Framework as a benchmark.

The purpose of this self-assessment is to identify strengths, weaknesses and risks, and then identify possible improvement actions. The self-assessment should be followed by the preparation and implementation of an improvement plan. The self-assessment checklist can also help in monitoring the progress of the national statistical office. It is not intended to be used for comparing the office's final score with that of others; the idea, rather, is that this score should serve to track the progress made.

The self-assessment should be conducted by a task force comprising people from different levels of management, including experts on the subject drawn from the whole statistical office, as well as experts on specific issues, such as gender mainstreaming. This can help mitigate biases that could render the replies less objective, as well as contributing to a common understanding of the situation from a more impartial perspective. Documentation, metadata and independent verification of the information provided are other measures that can help address the risk of subjectivity.

The self-assessment checklist is designed for rigorous, regular, high-quality assessments, preferably annual and no more than two years apart. However, it can also be used to provide an initial assessment (as part of a scoping exercise) or for learning purposes to introduce quality assurance tools to the staff of the national statistical office and the NSS.

The whole checklist has been translated into Spanish and forms part³ of the Excel tools that accompany this guide. However, the coordinating group responsible for this guide proposes that the diagnosis should begin with a subset of elements centred on the quality management of statistical processes and outputs.⁴

This subset of elements in the diagnosis was revised and adapted to the region on the basis of comments made by some countries in the review round.⁵ Annex 1 presents the compendium of requirements and elements identified as requiring a mandatory response in the self-assessment checklist adapted for the region. In addition, as indicated, the checklist is available in Excel format, in which the calculation of scores at the principles level is linked to from the elements to be assured so that users avoid subjectivity in passing from compliance with the elements to assessment of the requirement.

The adapted checklist focuses on levels C (Managing statistical processes) and D (Managing statistical outputs) of the United Nations National Quality Assurance Framework. In addition, questions corresponding to levels A (Managing the statistical system) and B (Managing the institutional environment) were selected to place the results in context.

Mandatory response requirements were identified, these being the minimum requirements for countries to be able to start implementing the Framework, determine how their indicators will be calculated and collect information in the assessment phase. The details of the mandatory response requirements and elements with their adjusted wordings can be found in annex 1.

Table II.1 shows how the instrument was configured once adaptation had been carried out.

Table II.1

Number of requirements and elements in the adapted self-assessment checklist

Level	Number of requirements	Number of elements
A: Managing the statistical system	14	68
B: Managing the institutional environment	27	100
C: Managing statistical processes	21	86
D: Managing statistical outputs	24	99

Source: Prepared by the authors on the basis of United Nations, “Annex: Detailed list of elements to be assured”, “United Nations National Quality Assurance Frameworks Manual for Official Statistics: Including recommendations, the framework and implementation guidance”, Series M, No. 100 (ST/ESA/STAT/SER.M/100), United Nations, New York, 2019.

The checklist is accompanied by a document entitled “Instructions for self-assessment using a checklist for statistical quality in the region” (see annex A2).⁶ These instructions include the step-by-step procedure for carrying out self-assessment and a glossary of terms to ensure a proper understanding of the content of the checklist, allowing the evaluation criteria to be standardized. The main instructions for applying the checklist are given below.

The Excel file that supplements this guide contains the self-assessment checklist adapted for the countries of the region and has three spreadsheets: “Elements to be assured”, “Checklist” and “Summary”. This tool is designed so that users only complete the first spreadsheet, “Elements to be assured”, where they must fill in the “Compliance” column for each of the elements to be assured, using the following reply alternatives:

- (i) Full compliance: the element described has already been implemented, and there is little room for improvement.
- (ii) Partial compliance: the element is not being fully addressed, and significant improvements are required to comply.
- (iii) Non-compliance: progress on implementation of the element described is minimal, and urgent action is required.

³ In an unedited Spanish version.

⁴ The coordinating group comprises Colombia, Mexico and ECLAC in its capacity as technical secretariat.

⁵ The adapted checklist was presented to the members of the Working Group in December 2020, and they were able to provide initial comments and feedback. During January and February 2021, the results of the pilot test were received from Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador and Mexico, and these results were presented to the countries of the region in March. In a subsequent round of the pilot test, Argentina went through the checklist and presented the results.

⁶ One result of applying the pilot test was that the coordinating group identified major dissimilarities in the way users completed the checklist and some user difficulties in interpreting certain terms seen as ambiguous or unclear, so the decision was taken to design a set of self-assessment instructions.

The implementation of a given element may also consist in implementation of an equivalent activity or practice, so it is useful to record descriptions of how the elements are complied with. These can be helpful for preparing plans of action and can be used as a benchmark for a future self-assessment exercise.

Lastly, the elements are evaluated directly using the compliance categories shown. Once the elements have been evaluated, a rating for the requirements and principles of the quality assurance framework is automatically obtained. This can be checked in the other two spreadsheets.

1. Main findings of the pilot test

The pilot test showed a large difference between the final scores obtained by the countries. There are cases where a country's score on all requirements is markedly higher or lower than the average. This pilot test showed that the difference was due to the way in which national statistical offices defined full compliance, partial compliance or non-compliance with a requirement, and not necessarily to dissimilarities in the levels of progress or maturity of the different countries.

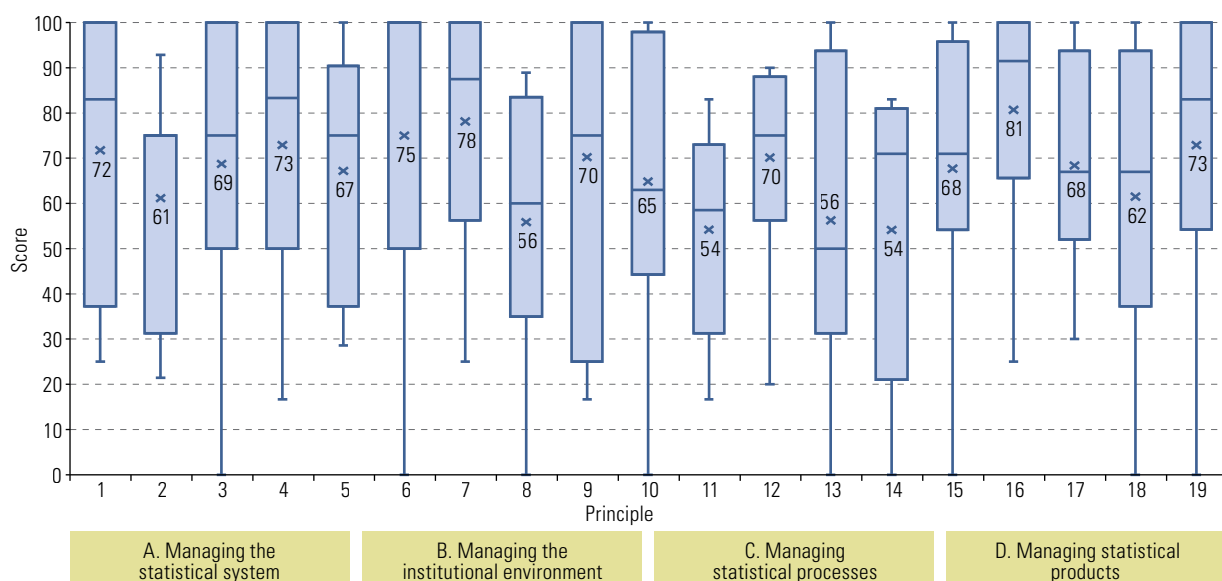
This led to improvements in the "Instructions for self-assessment using a checklist for statistical quality in the region",⁷ which present standardized concepts allowing for a more consistent assessment, and to the requirements being scored automatically on the basis of compliance. It is important to clarify, however, that the changes made do not permit of absolute comparisons between countries, but rather enable each country to be assessed over time.

Even though scores are not comparable across countries, these results, together with the detailed comments requested as part of the exercise and the analyses conducted with the countries, do reveal some commonalities across the region.

Figure II.1 presents the compliance percentages for each of the quality principles of the National Quality Assurance Frameworks Manual for Official Statistics. The values are averages, but there is wide dispersion, shown by the mode (the line dividing each box), which can be substantially above or below the average, as for example with principle 14, where most countries have an above-average level of compliance with the principle.

Figure II.1

Average and distribution of regional scores for each of the United Nations National Quality Assurance Framework quality principles
(Scores on a scale of 0 to 100)



Source: Prepared by the authors.

⁷ See annex A2 for the final version of the Instructions.

The findings for Level C, “Managing statistical processes”, will now be detailed.

For Principle 10, “Assuring methodological soundness”, it was repeatedly stated that it was not feasible to guarantee that those responsible for administrative records would deliver the information within the stipulated deadlines and in accordance with the parameters established for its statistical use. This situation is prevalent in countries whose legislation does not incorporate this feature, thus creating governance difficulties.

The findings for Principle 11, “Assuring cost-effectiveness”, are affected by the technological infrastructure, since the countries stated in the self-assessment exercise that there was only a low level of automation of the processes associated with statistical production. Although the use of technology for data collection was reported, information technology infrastructure was outdated and could not easily incorporate new tools.

Similarly, although some progress has been made thanks to the development of technological tools, the countries indicated that much still needed to be done to implement standardized costing systems. This would make it possible to strengthen statistical operations through the consolidated projection of costs and expenditures in the different phases of execution and, in turn, to generate information of value for decision-making.

With respect to Principle 13, “Managing the respondent burden”, a number of national statistical offices were found to have inflexible sampling techniques that prevented the respondent burden from being distributed, so that the results reflect partial compliance in most cases. Another common feature in some national statistical offices is the lack of indicators to measure the respondent burden, which contributes to the low score for this principle.

With regard to level D, “Managing statistical outputs”, the countries in the region performed strongly on Principle 16, “Assuring timeliness and punctuality”. Brazil, Colombia, Costa Rica and Cuba, for example, demonstrated full compliance with all the elements composing this principle. The background to these results is mainly the implementation of international good practices and recommendations related to the timeliness and punctuality of statistics. They include the management and monitoring of release calendars and proper management of data providers and their needs.

Similarly, the results for Principle 19, “Managing metadata”, show the effort the countries have made to provide documentation associated with statistical information. This allows users to interpret the data appropriately, which is reflected by the high scores in the assessment. Another finding is that there are training programmes in place in national statistical offices to promote and disseminate metadata management guidelines and standards.

B. Linking risk management with statistical quality assurance

Risk management, which has traditionally been applied in the fields of financial administration, security and protection, has in recent years been extended to other development programmes or projects, and also to the production of statistics. Risk management is generally carried out in accordance with the recommendations of national authorities and may be mandatory.

It is important for risk management to be coordinated closely with statistical quality management activities, as the two frameworks are complementary and should not operate independently of each other. A coordinated approach to quality and risk management is cost-efficient and facilitates the involvement and support of the organization’s management.

The National Quality Assurance Framework states that risk management in the production of statistical information “can be described as quality assurance for the different phases of a statistical production model (i.e., the Generic Statistical Business Process Model (GSBPM)) in terms of mitigating risks to quality at those phases” (United Nations, 2019, p. 36). Indeed, it has been established that the following elements should be assured under requirement 8.8 (United Nations, 2019, p. 104), which refers to the performance of risk analyses that address the quality of the most important statistical outputs and processes:

- Risk and statistical quality management must be closely coordinated (e.g., through institutional arrangements and regular meetings if responsibilities for these activities are set out differently).
- Risks linked to core recommendations and principles of the National Quality Assurance Framework (e.g., lack of independence and confidentiality breaches) must be analysed and measures taken if needed to improve compliance.
- Risk analyses addressing the quality of different stages of statistical production must be conducted according to the GSBPM.
- Risk analyses addressing the quality of important statistical products such as population statistics and censuses, national accounts and consumer price indices must be performed (e.g., risk of poor accuracy expressed by errors, poor timeliness and lack of comparability).

Box II.1

Risk management during the coronavirus disease (COVID-19) pandemic

The preparation of this guide coincided with the COVID-19 pandemic, so a Working Group session was held to learn about the measures implemented in the various national statistical offices. This crisis, which shook the whole world, confirmed that some elements that are not directly linked to official statistics can nevertheless affect them. It is therefore necessary to highlight the importance of risk management in the statistical process and its link with quality assurance.

Identification of a common risk

Information gathering was directly affected during the periods of lockdown mandated in the early stages of the COVID-19 pandemic, owing to the impossibility of conducting face-to-face interviews. In order for the survey to be conducted, informants were contacted and interviewed by telephone.

Effects on quality

While the risks materialized in the collection and compilation phase because of the low coverage and incompleteness of the information, the treatment measures implemented were applied at different stages of the statistical production process in order to preserve the quality of the information provided to users.

The following table presents some of the measures implemented during the COVID-19 pandemic and the quality principles that were affected or safeguarded by these actions.

Phase of the production process (Generic Statistical Business Process Model (GSBPM))	Measures implemented during the COVID-19 pandemic in the region	Quality principles
Detection of needs	Identification of priority outputs Development of new statistical products.	Relevance
Design	Modification of samples Adjustment of classifications.	Accuracy Consistency Comparability
Construction	Adjustment of collection and processing systems.	Consistency Comparability
Information gathering	Modification of information gathering methods (e.g., telephone surveys).	Relevance Consistency Comparability Timeliness
Processing	Restriction of indicator disaggregation levels.	Relevance Accuracy Accessibility
Analysis	Specific analyses of utility for decision-making.	Relevance Timeliness
Dissemination	Delayed release of results.	Timeliness Punctuality Accessibility
Assessment	Specific assessments of new methods and outputs. Preparation of explanatory notes.	Accuracy Credibility Clarity

Box II.1 (concluded)

Specific actions carried out by the countries:

- Among the main methodological actions implemented, the National Institute of Statistics (INE) of Chile carried out an analysis of the impact and possible estimation biases in the main study domains, particularly for the National Employment Survey, given the drastic decrease in the sample during the pandemic. In addition, the statistical quality of the published estimates was assessed month by month (focusing specifically on the dimension of accuracy) and users were kept informed through technical notes published on the institutional website.
- Another important methodological adjustment carried out by the Chilean INE concerned the design of the classification of disposition codes for telephone data collection. The objective was to broaden the classification to accurately capture incidences registered through telephone contact, distinguishing them from those arising in face-to-face interviews, while maintaining consistency and complementarity between the two modes of application. One of the most important aspects considered for the extension of the classification was the need to adequately distinguish the eligibility status of previously selected dwellings, on the understanding that the eligibility of units is subject to an area framework.^a
- One of the treatment measures adopted in Brazil was to temporarily restrict some levels of indicator disaggregation to mitigate the influence of these characteristics on the results for estimation domains where the confidence intervals were not within the expected limits.
- Methodological adjustments were made to the classification of disposition codes for the mixed mode of collection. The proposal includes codes for a face-to-face collection stage, in which the dwelling is registered, and subsequently a set of codes for telephone interviews. This allows non-response rates to be correctly measured at the different stages in order to generate mitigation plans.

Source: Prepared by the authors.

^a Economic Commission for Latin America and the Caribbean (ECLAC), "Continuity of household surveys after the coronavirus disease (COVID-19) pandemic", *COVID-19 Reports*, Santiago, December 2020.

C. Use of standards

The use of standards is fundamental in quality assurance, since it establishes a common language between the information-producing unit and the user. Experiences in the region's countries include the widespread use of national and international standards adopted as part of their methodologies, employing benchmarks from the United Nations, the Economic Commission for Europe (UNECE), Eurostat, the Economic Commission for Latin America and the Caribbean (ECLAC), the Organisation for Economic Co-operation and Development (OECD) and the International Organization for Standardization (ISO), among others.

Six types of standard in particular are used in the region: (i) the standards of the United Nations National Quality Assurance Framework and Fundamental Principles of Official Statistics; (ii) standards regulating the production process for statistical operations, based mainly on the GSBPM proposed by UNECE; (iii) statistical standards designed to facilitate integration, comparability and interoperability, based on different national and international catalogues; (iv) standards for the metadata of information made available to users (Data Documentation Initiative and open data); (v) metadata standards for information on production processes (Statistical Data and Metadata eXchange (SDMX), Generic Statistical Information Model (GSIM) and Generic Activity Model for Statistical Organizations (GEMOA)); and (vi) standards related to the inclusion of the differential and intersectional approach in the production and assessment of statistical quality.

These types of standards are briefly described below, as are some actions that can contribute to their implementation, based on the experiences of different countries in the region that were presented in the Working Group.

1. The United Nations National Quality Assurance Framework and Fundamental Principles of Official Statistics

It is desirable to have an institutional document that establishes a commitment to quality and serves to guide the actions of the various institutions and individuals involved in the production and dissemination of statistics.

The National Administrative Department of Statistics (DANE) of Colombia, as coordinator of the NSS and the main producer of statistics in the country, has adopted the Fundamental Principles of Official Statistics of the United Nations and the statistical standards issued internationally in different laws, decrees and regulations. In Brazil, Costa Rica and Ecuador, among other countries, country-specific codes of good statistical practice have been established on the basis of the ECLAC Code of Good Practice in Statistics for Latin America and the Caribbean, which has been adopted by all countries in the region.

2. The Generic Statistical Business Process Model (GSBPM)

This model regulates the statistical production process, establishing eight phases (specify needs, design, build, collect, process, analyse, disseminate, evaluate). A total of 44 subprocesses are established for these phases. UNECE has been promoting this model since 2008, and it has been implemented at different national statistical offices, both in Latin America and the Caribbean and internationally. The following are some of the actions put in place to implement this model:

- establishment of technical standards regulating the stages of the production process;
- development of a data repository for each phase of the production process;
- structuring of a cost model for each information programme and stage of the production process;
- provision of specific training courses for persons contributing to a certain phase, even though they might work for different statistical operations;
- development of guides to standardize activities and data for certain subprocesses;
- evaluations and indicators to monitor some phases and subprocesses.

3. Catalogues, classifications and good practices

There are several catalogues and classifications based on international recommendations that have been adopted by some of the region's countries. Ecuador has adopted the International Standard Industrial Classification of All Economic Activities (ISIC), the Central Product Classification (CPC) and the International Standard Classification of Occupations (ISCO).

Colombia is a noteworthy case, with DANE developing the National Code of Good Practices for Official Statistics of the National Statistical System to promote the use of statistical standards that facilitate the integration, comparability and interoperability of statistics. To meet its commitments to OECD and the United Nations, DANE has adopted methodologies and recommendations for statistical production that enable it to produce the reports submitted to these organizations and strengthen the credibility of its statistics with rigorous and recognized techniques.

4. Metadata of publicly available information

Some countries, such as Ecuador and Mexico, have adopted the open data standard, which is designed to ensure that information is freely available and accessible (preferably downloadable from the Internet); that it is presented in a convenient and editable form; that the data can be reused and redistributed, and even integrated with other datasets; and that participation is universal, so that all users can employ them.

Other countries such as Brazil, Ecuador and Mexico have adopted the Data Documentation Initiative proposed by a partnership of universities and research institutions from different countries. The Data Documentation Initiative is an international standard for describing data produced from surveys, censuses or administrative records, in order to facilitate the interpretation of the information by users. The partnership has made available software that allows different phases of the production process to be documented, such as the conceptualization, collection, processing and archiving of data, which are useful for interpreting the final information. The following are some of the actions that have been taken to implement this metadata standard:

- establishment of a technical standard requiring the information published to be accompanied by the corresponding metadata and specifying the characteristics that these metadata must have;
- adaptation of the software to the country's specific needs;
- metadata production training and follow-up strategies for dealing with the links of each information output.

5. Internal metadata for statistics production

Metadata standards for statistical production are used in several of the region's countries. In particular, Brazil uses the Single Integrated Metadata Structure (SIMS), which is based on the Statistical Data and Metadata eXchange (SDMX), while the Generic Statistical Information Model (GSIM) is used for structural metadata. Each of these standards will now be briefly described:

- Statistical Data and Metadata eXchange (SDMX): an international initiative that aims at standardizing and modernizing (industrializing) the mechanisms and processes for the exchange of statistical data and metadata among international organizations and their member countries.
- In the European Statistical System, the quality of statistical processes and results is assessed and reported on the basis of standardized rules and reporting structures, using a common technical environment: the Single Integrated Metadata Structure (SIMS) metadata manager.
- The Generic Statistical Information Model is a reference framework of internationally agreed definitions, attributes and relationships which describes the information items used in the production of official statistics (information objects). It encompasses the entire statistical process and includes information on the objects used in the phases of the GSBPM; it covers everything from specifying needs to carrying out evaluations and assessments.

6. Standards for mainstreaming the gender perspective in the statistical process

Some countries in the region, such as Chile and Colombia, have developed guidelines for gender mainstreaming at every stage of statistical production and analysis. At the international level, the United Nations Department of Economic and Social Affairs (DESA) has prepared a document to guide the process of gender mainstreaming in each country's official statistics ("Integrating a gender perspective into statistics" (ST/ESA/STAT/SER.F/111), 2016). It is essential for national statistical offices in the region to implement, adapt and update the concepts, variables, questionnaires and classifications they apply, as well as their tools and training programmes, using this approach to ensure the statistical quality of their operations.

D. Considerations regarding new data sources and the Sustainable Development Goals

Implementing the 2030 Agenda, achieving the Sustainable Development Goals (SDGs) and mainstreaming the gender perspective for each indicator and Goal is statistically challenging in terms both of the scope and disaggregation of the data and of the timeliness and reliability of measurements. However, the digital transformation and new data sources provide an opportunity to overcome these challenges.

The United Nations National Quality Assurance Frameworks Manual for Official Statistics distinguishes data sources by purpose and by the entity responsible for collecting the information. According to these criteria, data sources are classified into the following (United Nations, 2019):

- (i) Statistical sources: these are compilations of data created mainly for official statistics by government agencies. Statistical data sources include sample surveys, censuses and statistical registers.
- (ii) Administrative registers: these are datasets created primarily to serve the purposes of government agencies rather than in response to a statistical need.
- (iii) Other information sources: these include all datasets that are not created for statistical purposes or for official administrative records, but for commercial or private purposes. In general, they include data sources associated with big data.

Each information source presents challenges that can be overcome by incorporating another type of source into the statistical work. For example, statistical sources present challenges such as increasing non-response, high costs of production and low frequency of implementation. These challenges can be addressed, at least to a large extent, by incorporating the use of administrative records into the statistical production process. In turn, some of the problems that arise from using administrative records as data sources can be overcome by including other sources of information.

The challenges involved in using each information source affect compliance with the quality requirements of both the National Quality Assurance Framework and the Fundamental Principles of Official Statistics. It is therefore essential to use different sources of information when generating official statistics in order to meet quality requirements and to respond to the increasing demands for information arising from implementation of the SDGs and from the general need to produce information for decision-making.

The region still has work to do to incorporate administrative records as a source of information for official statistics, even though they are vital for monitoring and reviewing achievement of the SDGs in the countries. The inclusion of other information sources is a medium- or long-term goal for most of the countries.

As part of the process of identifying the difficulties and applications of the different sources of information in the countries of the region, these were asked about the main barriers they have encountered in reporting on the SDGs in relation to information sources. The barriers they mentioned were:

- the high level of data disaggregation needed to ensure that “no-one is left behind”, requiring a major effort to improve the tools used in statistical operations with a view to disaggregating figures by population groups;
- the lack of connection between the production of geographical and statistical information;
- the lack of mechanisms to assess the quality of information from administrative records with statistical potential;
- weaknesses in the incorporation of alternative sources, such as satellite imagery, and of new methods of processing these data (e.g., machine learning);
- the linking of new actors to the NSS in order to take advantage of non-traditional sources of information and the lack of quality processes for these actors;
- untimely information.

All the above shows the need to establish mechanisms that enable other information sources to be included in the generation of official statistics. However, these sources must be incorporated in such a way that the challenges involved in using the source are overcome and the quality criteria for official statistics are met.

As already mentioned, the use of other information sources is a medium- or long-term goal for most countries in the region. The main challenges involved are much the same as those identified for the use of administrative records. However, the legal and technological challenges posed by these sources are greater, as is the challenge in terms of data quality, especially in the estimation of selection biases and associated non-sampling errors. Even so, some countries, such as Colombia, have started to work with other data sources and to generate experimental statistics, leading to a variety of innovations in sources, methodologies and subject matter. To assure the quality of these experimental statistics, 6 of the 11 quality attributes identified in the National Quality Assurance Framework were chosen.

Chapter III

Best practices in the region for compliance with the principles of levels C and D of the National Quality Assurance Framework (principles 10 to 19)

The region's countries make constant efforts to comply with the Fundamental Principles of Official Statistics and especially to ensure the quality of statistics. This chapter highlights these endeavours by identifying the best practices proposed by the countries to fulfil the requirements for maintaining quality standards in statistical processes and outputs.

The countries' efforts go beyond the practices compiled in this chapter. However, considering the length of this document, priority has been given to describing replicable and innovative practices. Accordingly, emphasis is placed on practices for which sufficient information and forms of measurement employing synthetic indicators are available, and on practices that differ from those that most national statistical offices implement.

Table III.1 does not include practices for all the requirements assessed at the levels concerned. There are two possible reasons for this: (i) practices relating to requirements which most countries already comply with to a high degree were not included and (ii) practices that do not meet the criteria of replicability and innovation were likewise not included. The main tools used by the countries to assess compliance with the requirements are self-assessment tools generated to monitor compliance with the code of good practice of the country or region, as appropriate. There are few data on indicators or tools designed to assess quality requirements directly, so the self-assessment checklist presented in chapter II can be an important support tool for the countries.

Table III.1

Summary of good practices in the region for complying with the principles of levels C and D of the National Quality Assurance Framework (principles 10 to 19)

Requirement	Replicable practices relating to the requirement in the region
Level C: Managing statistical processes	
Principle 10. Assuring methodological soundness	
10.1. The methodologies applied by statistical agencies are consistent with international standards, guidelines and good practices, and are regularly reviewed and revised as needed.	The National Institute of Statistics (INE) of Chile reviews outputs at the level of the Consumer Price Index Expert Committee and the Employment Survey. In the case of the price base year change 2018=100, the most important methodological changes are presented to the expert committees, in addition to being regularly presented to the Central Bank of Chile. Methodologies are reviewed jointly with the Central Bank of Chile and an in-depth analysis is carried out by sector, incorporating current international recommendations.
10.2. The statistical agencies recruit qualified staff and conduct regular programmes to enhance their methodological skills.	Mexico's National Institute of Statistics and Geography (INEGI) has an annual training and refresher programme for public servants involved in the generation of statistical and geographical information for the National Statistical and Geographical Information System (SNIEG). This practice is based on the Law of the National Statistical and Geographical Information System, article 36 of which states that INEGI, in its capacity as coordinator of SNIEG, may promote different mechanisms and activities that foster the all-round development of the technical capacities of public servants at the National Statistical and Geographical Information Units (see "Ley del Sistema Nacional de Información Estadística y Geográfica", <i>Diario Oficial de la Federación</i> , 2021). There is also the Professional Careers Service for the recruitment of qualified staff (see [online] https://www.inegi.org.mx/app/spc/default.html).
10.3. The statistical agencies choose data sources taking into account accuracy and reliability, timeliness, cost, the burden on respondents and other necessary considerations.	Costa Rica has formed an interdisciplinary working team to develop its Administrative Records System (SIRA), which will aim to integrate all administrative records that the institution is currently working with or that may be requested in the future. The aim is to address issues such as the transfer, availability, security, processing, safekeeping and use of administrative records from a technical and information technology (IT) perspective.
(a) Administrative records.	In Colombia, the National Administrative Department of Statistics (DANE), as the lead agency, has a Programme for Strengthening Administrative Records (see [online] https://www.sen.gov.co/servicios/fortalecimiento-registros-administrativos), which provides a number of tools designed to improve the quality of the administrative records held by each entity and exploit them statistically. These tools cover three specific areas: diagnosis, design and anonymization. Entities can choose which areas they wish to implement tools in to strengthen their administrative records, depending on their objectives, and can access the tools free of charge and autonomously.
(b) Sampling frameworks.	In Chile, the housing sampling frame that came into effect in July 2019 was constructed on the basis of information from the 2016 pre-census and the 2017 census. This frame is formed by identifying geographical areas that are compact and homogeneous in terms of the number of dwellings and is socioeconomically stratified. It has been determined that it should be updated every year on the basis of administrative records and field observations. The information collected during surveys is used to evaluate and improve the quality of the statistical frameworks, especially in relation to their coverage and the quality of contact variables and auxiliary information (variables used for the sample design).
10.5. The statistical agencies cooperate with the scientific community to improve methods and promote innovation in the development, production and dissemination of statistics.	Chile's INE has been progressively signing agreements with public institutions for the management of large databases. An example is the agreement signed with the Millennium Data Foundations Institute, which will enable resources, capacities and work to be pooled in order to pursue matters of joint interest in scientific and technological research relating to databases, the semantic web, algorithms, data mining, artificial intelligence, big data and network behaviour, among other subjects connected to statistical development and production.
Principle 11. Assuring cost-effectiveness	
11.1. The costs of producing all individual statistics are measured and analysed, and mechanisms are in place to assure the cost-effectiveness of statistical activities or processes.	Colombia's DANE and Mexico's INEGI, in their role as producers of statistics, use a tool called the "costing system" to calculate the costs of statistical operations. This tool can be used to make a consolidated projection of costs and expenditures in the different phases of execution and thence generate valuable information for decision-making. The costing system contributes to the proper use of resources, as it allows the costs of statistical operations to be calculated in accordance with staff, material and technology requirements and is a necessary input for determining the budget margin for their execution. See National Institute of Statistics and Geography (INEGI), "Resultados del modelo de costos 2020", 2021 [online] https://extranet.inegi.org.mx/calidad/presentaciones-de-la-segunda-sesion-de-2021/ .
11.2. Procedures exist to assess and justify demands for new statistics against their cost.	Brazil, Chile, Colombia and Costa Rica have established procedures for the detection, standardization and evaluation of information needs, including the stipulation of activities aimed at evaluating new statistical projects, considering technical, operational and financial criteria (evaluation of the necessary resources) for establishing the feasibility of implementing them. Chile is implementing a mechanism whereby organizations belonging to the national statistical system (NSS) can make requests by completing a form in the Statistical Initiatives System available on the institutional website (see [online] https://ine.cl/institucional/sistema-estadistico-nacional/sistema-de-iniciativas-estadisticas). Subsequently, each of these proposed initiatives is evaluated for relevance and feasibility. Colombia's procedure for the identification of statistical information needs for the characterization of interest groups ("Procedimiento para la identificación de necesidades de información estadística para la caracterización grupos de interés", DANE DAR-Q20-PD-003) also meets the objectives of characterizing new users, which it does by means of a matrix for the identification of statistical information needs and the characterization of interest groups, and of prioritizing statistical information needs for the formulation of the National Statistical Plan. Mexico has indicators to measure relevance and information needs. The use of information programmes and indicators, among other instruments, is identified in the National Development Plan, in follow-up of progress towards the Sustainable Development Goals (SDGs) and in various international treaties (see [online] https://extranet.inegi.org.mx/calidad/indicadores-de-calidad-y-evaluaciones/).

Table III.1 (continued)

Requirement	Replicable practices relating to the requirement in the region
Principle 11. Assuring cost-effectiveness	
11.3. Procedures exist to assess the continuing need for all statistics, to determine whether any can be discontinued to free up resources.	
12.3 Procedures are in place to effectively use administrative and other data sources for statistical purposes.	
14.1 Procedures are in place to identify users and their needs and to consult them about the content of the statistical work programme.	
11.4. Modern information and communication technologies are applied to improve the performance of statistical processes.	Chile's INE has introduced new techniques, such as web scraping and e-learning, which allow different information sources to be combined. Among the different initiatives launched, particular mention should be made of the development of automated coding models, based on e-learning techniques, to implement statistical classifiers. Web scraping, meanwhile, has been implemented mainly in the CPI data collection process, since it allows prices to be captured via complementary information sources such as web pages.
11.5. Proactive efforts are made to improve the statistical potential of administrative data and other data sources.	Costa Rica is carrying out a project to integrate administrative records with a view to creating a unique population register and a statistical register of economic units, while evaluating the integration of data from these sources in order to lighten the burden on the collection instruments used in the different statistical operations.
11.6. The statistical agencies define, promote and implement integrated and standardized production systems.	Colombia's DANE, in its role as a producer of statistics, uses adaptations of the Generic Activity Model for Statistical Organizations (GAMSO) version 1.2 (2019) and the Generic Statistical Business Process Model (GSBPM) version 5.1 (2019) published by the Statistics Division of the Economic Commission for Europe (UNECE). GAMSO establishes additional activities needed to support statistical production at national statistical organizations, and DANE creates new processes to support statistical production accordingly. An example is its data supplier management process, whose purpose is to establish and implement mechanisms for liaising and negotiating with data suppliers in a relevant, timely, reliable and complete manner, in order to obtain the data needed in the statistical information production process.
Principle 12. Assuring appropriate statistical procedures	
12.1 Statistical processes are tested before implementation.	In the statistical processes of Brazil, Chile, Colombia, Costa Rica and Mexico, tests are identified during the design phase, in the testing plan, and are implemented in the construction phase. The information gathering or compilation instruments and the production system are tested, and a pilot test of the statistical process is carried out. Testing is essential to ensure that design, construction or development meets the proposed objectives and generates the expected results. On the basis of the test findings, appropriate adjustments are made in the design and construction phases, including documentation.
12.2 Statistical processes are well established and regularly monitored and revised as required.	In Chile, Colombia and Mexico, application of the GSBPM-based production model contributes to the quality and efficiency of statistical production. In addition, the model is oriented towards processes and subprocesses, which allows methods and procedures to be standardized across statistical offices and synergies between these methods and procedures to be detected. In addition, Colombia and Ecuador conduct statistical quality assessments based on technical standards. Colombia's DANE uses the Technical Standard for the Quality of the Statistical Process (NTC PE 1000), checking for compliance with its requirements. Ecuador's National Institute of Statistics and Censuses (INEC) uses the Technical Standard of the Statistical Operations Quality Certification System. See National Administrative Department of Statistics (DANE), <i>Norma técnica de la calidad del proceso estadístico: requisitos de calidad para la generación de estadísticas</i> (NTC PE 1000), 2020 [online] https://www.dane.gov.co/files/sen/normatividad/NTC-Proceso-Estadistico-PE-1000-2020.pdf ; National Institute of Statistics and Geography (INEGI), <i>Norma técnica del proceso de producción de información estadística y geográfica para el Instituto Nacional de Estadística y Geografía</i> , 2019 [online]. https://sc.inegi.org.mx/repositorioNormateca/On_19Nov21.pdf ; and National Institute of Statistics and Censuses, <i>Norma técnica del sistema de certificación de la calidad de las operaciones estadísticas, n/d</i> [online] https://www.ecuadorencifras.gob.ec/documentos/web-inec/Normativas%20Estadisticas/Normas_Tecnicas/Norma_tecnica_del_sistema_de_certificacion_de_la_calidad.pdf .
12.4 Revisions of statistics follow standard and transparent procedures.	In Brazil, the statistical outputs of the Brazilian Institute of Geography and Statistics (IBGE) must be analysed by the respective statistical production teams, in accordance with the IBGE Statistical Operations Published Data Review Policy. There is a questionnaire for self-assessment of the IBGE Code of Good Statistical Practices, which includes the following questions to measure the type of revisions: How many IBGE statistical operations regularly evaluate and validate their: P014BP1-110 - original data? P014BP1-111 - intermediate results? P014BP1-112 - statistical outputs? P014BP1-113 - Are the results of IBGE statistical operations compared with other existing sources of information to ensure their validity?

Table III.1 (continued)

Requirement	Replicable practices relating to the requirement in the region
Principle 13. Managing the respondent burden	
13.1 The range and detail of requested information is limited to what is necessary.	Colombia has a guide to reducing the burden on sources (<i>Guía para la reducción de la carga a las fuentes</i>) as a strategy for minimizing the strain on these. See [online] https://www.sen.gov.co/files/guias/Gu%C3%ADa%20para%20la%20reducci%C3%B3n%20de%20la%20carga%20a%20fuentes%20V2.pdf .
13.3 Sound methods, including IT solutions, are used in surveys to reduce or distribute the respondent burden.	Brazil, Colombia, Costa Rica and Mexico conduct most of their surveys using a computer-assisted personal interviewing technique. Survey skip patterns are incorporated into their basic programming, which facilitates and speeds up implementation.
Level D: Managing statistical outputs	
Principle 14. Assuring relevance	
14.2 Users' needs and requirements are balanced, prioritized and reflected in the work programme.	As the national coordinating body of the statistical and geographical systems, Brazil's IBGE regularly holds the National Conferences on Statistics (CONFEST) and the National Conferences on Geography and Cartography (CONFEGE). The purpose of these conferences is to evaluate the General Plan of Statistical and Geographical Information (PGIEG) currently being implemented, with a view to formulating a new, more up-to-date and more comprehensive plan that is better able to meet Brazilians' information needs. The country's main producers and users of statistical information are involved in its development.
14.3 Statistics based on new and existing data sources are being developed in response to society's emerging information needs.	At the National Institute of Statistics and Censuses (INEC) of Costa Rica, the production units respond to requests involving the generation of timely information for policymaking in crisis or emergency situations by carrying out special processing of data already collected through the design of special modules incorporated into ongoing surveys (e.g., for the COVID-19 crisis in 2020 and 2021). This is done through the implementation of an institutional procedure whose basic objective is to guide users in two areas: (i) within the institution, to establish which operation is best suited to meeting the need for information and, at the same time, to ascertain which investigations or requests have been worked on previously, with the obvious aim of optimizing resources; and (ii) in new operations, to determine the information requirement, the objectives of the investigation, its scope, its application in terms of public policy and the outputs aimed at.
Principle 15. Assuring accuracy and reliability	
15.1 Source data, integrated data, intermediate results and statistical outputs are regularly assessed and validated.	In Mexico, since 2019, the INEGI quality report has presented an assessment of the statistical results from the different information programmes, considering the different dimensions of quality, in particular that relating to the indicators of statistical accuracy obtained in the information programmes generated in the year immediately preceding. For information programmes whose inputs are administrative records, three indicators are calculated: (i) the over-coverage rate, (ii) the non-response rate at the unit level and (iii) the non-response rate at the level of the variable. What is calculated for surveys are the coefficient of variation, standard error, confidence intervals and coverage of the design variable (for surveys with non-probability sampling).
15.2 Sampling errors are measured, evaluated and documented. Non-sampling errors are described and, when possible, estimated.	At Chile's INE, sampling errors are calculated and made available in most products. The Frame and Sample Design Subdepartment has established a quality estimation standard for household surveys to determine whether indicator estimates meet the requirements for publication. This standard is being implemented by the strategic project "Shared services for statistical production" in RStudio Server software to facilitate its application.
15.3 Studies and analyses of revisions are carried out and used to improve data sources, statistical processes and outputs.	Colombia's DANE pursues continuous evaluation and improvement of statistical processes and outputs by implementing a statistical quality instrument called "Focused Review", which serves to identify the root causes of problems reported by users of the statistical operations produced in the NSS, at the different stages of the statistical process. This makes it possible to establish the strategies and actions to be implemented to address these causes. Problems are identified by filling in the Problem Identification Form, which is structured in three modules: (i) the data of the person reporting the problem, (ii) identification of the problem and (iii) general aspects of the use of the information. By virtue of what is reported by the user in this format, the thematic team responsible for the statistical operation carries out an analysis of the problem in order to validate its existence, determine its impact, characterize it and prioritize it. Subsequently, the team in charge of the targeted review formulates a research hypothesis about the root cause of the problem identified. This is the starting point of the process, which includes identification of the research route and data collection and review. It also includes an analytical phase in which a set of operations, reflections and verifications are carried out on the basis of the information collected and the application of the support tool, making it possible to establish the causes related to the research problem and to draw preliminary conclusions from the analysis carried out.
Principle 16. Assuring timeliness and punctuality	
16.1 The timeliness of the statistical agency's statistics complies with international standards or other relevant timeliness targets.	In Mexico, the INEGI Quality Assurance Committee approved the institutional indicator for the timeliness of statistical and geographical information, whose objectives are for internal use and which supports decision-making relating to the timeliness of dissemination. This indicator is included in the Quality Assurance Report every year. See [online] https://extranet.inegi.org.mx/calidad/wp-content/uploads/2018/02/Ficha-tecnica_indicador_institucional_de_timeliness.pdf .
16.2 The relationship with data providers is managed with regard to timeliness and punctuality needs.	Colombia's DANE has a protocol that regulates internal work in relation to data providers. The purpose of this protocol is to allow the system used in each organization to be shared between the DANE remote teams and a data provider in a formal, functional, effective and independent way. A guide for information sharing (exchange protocols) has also been created, describing the phases that must be included when implementing projects that promote interoperable processes, in order to implement a strategy appropriate to the needs of statistical information sharing between the entities that require it. See National Administrative Department of Statistics (DANE), <i>Guía para realizar intercambios de información (protocolos de intercambio)</i> , 2020 [online] https://www.sen.gov.co/files/sen/lineamientos/Guía_Protocolos_de_Intercambio.pdf

Table III.1 (continued)

Requirement	Replicable practices relating to the requirement in the region
Principle 16. Assuring timeliness and punctuality	
16.4 Punctuality is measured and monitored according to planned release dates, such as those set in a release calendar.	<p>Colombia's DANE has prepared recommendations for the dissemination and availability of statistical information (<i>Recomendaciones para la difusión y el acceso de información estadística</i>), an internal document providing recommendations for preparing the release timetable.</p> <p>See [online] https://www.sen.gov.co/files/sen/lineamientos/Recomendaciones%20para%20la%20difusio%CC%81n%20y%20acceso.pdf. In the case of Mexico's INEGI, compliance with the release calendar is measured by the following punctuality indicators to evaluate and monitor compliance with deadlines:</p> <ul style="list-style-type: none"> – The percentage of statistical and geographical projects published on the INEGI website whose release date was committed to in the INEGI calendar for the dissemination of statistical and geographical information and information of national interest. See [online] https://extranet.inegi.org.mx/calidad/wp-content/uploads/2018/02/FT_IC_Punctuality_proyectos_en_calendario.pdf. – The percentage of statistical and geographical projects included in the INEGI calendar for the dissemination of statistical and geographical information and information of national interest that are released on time. See [online] https://extranet.inegi.org.mx/calidad/wp-content/uploads/2018/02/FT_IC_Punctuality_publicacion_puntual_act_171205.pdf.
Principle 17. Assuring accessibility and clarity	
17.1 Statistics are presented in a form that facilitates proper interpretation and meaningful comparisons.	<p>Colombia has its recommendations for the dissemination and availability of statistical information (<i>Recomendaciones para la difusión y el acceso de información estadística</i>), a document that provides guidance on the release of statistical results aimed at meeting users' information needs. These products consolidate statistical information in accordance with the delivery formats provided for in the design, and may therefore include traditional methods such as output and historical results tables, arrays, graphs, newsletters, methodologies, digests, extracts and yearbooks, stand-alone databases, journals and other publications, and electronic formats and new technologies such as dynamic query systems, interactive georeferenced systems, static and dynamic databases and multimedia systems. Technical criteria, tools, strategies and the different delivery products are specified from the design phase onward. In accordance with this, statistical products are specified from the needs detection and analysis phase, and the target user base, update protocols and user contact details are likewise determined to expand the information available on the products that are expected to be produced.</p> <p>See National Administrative Department of Statistics (DANE), <i>Recomendaciones para la difusión y el acceso de información estadística</i>, 2020 [online] https://www.sen.gov.co/files/sen/lineamientos/Recomendaciones%20para%20la%20difusio%CC%81n%20y%20acceso.pdf.</p>
17.2 A data dissemination strategy and policy exists and is made public.	<p>In Resolution No. 3121 of 2018 creating and regulating statistical information quality process arrangements and establishing other provisions, Colombia's DANE, as a producer of official statistics, provided for the annual preparation of a dissemination plan to be submitted to the entity's Technical Committee. It also sets out guidelines on the content of technical bulletins, which must reflect the disaggregation of results contained in the methodology sheet and its visual elements (tables, charts or graphs), and establishes the responsibility of the technical directorates to ensure consistency, coherence and other quality attributes of the delivery products.</p> <p>See National Administrative Department of Statistics (DANE), "Resolución núm. 3121 de 2018 por la cual se Crean y Reglamentan Instancias del Proceso de la Calidad de la Información Estadística y se Dictan Otras Disposiciones", 2018 [online] https://www.dane.gov.co/files/acerca/Normatividad/resoluciones/2018/Resolucion-3121-de-2018.pdf.</p>
17.3 Modern information and communication technology is used for facilitating easy access to statistics.	<p>Belize has a statistical and geographical data platform, Open Geo Data, for accessing geographical content. The tool has a gallery of maps covering census, demographic and social topics, among others. In addition, it can be used to download different documents of interest in PDF format and to review and download Excel data tables, base mapping packages and spatial layers found in the different maps published in a variety of formats. The Statistical Institute of Belize provides all its publications online and free of charge. It also uses online platforms such as REDATAM to release census data and the portal of the national statistical system to release system indicators.</p>
17.4 Access to microdata is allowed for research purposes, subject to specific rules and protocols on statistical confidentiality that are posted on the statistical agency's website.	<p>Colombia has issued a guide for its specialized off-site processing facility, the <i>Guía para la sala de procesamiento especializado externo (SPEE)</i> (COM-070-GUI-007). The specialized off-site processing facility is a service provided by DANE to specialized researchers, Colombian or foreign, who need to access and process the anonymized microdata of the different research studies produced by the entity that are not available on the website. The main objectives are: (i) to provide users with information access facilities, channels of dialogue and specialized support in the use of databases of statistical operations at microdata level and (ii) to receive added value in the research carried out. The information available at the specialized off-site processing facility complies with the database anonymization regulations established by DANE to ensure that data can be used without violating statistical confidentiality, in accordance with the National Code of Good Practices for Official Statistics and the Law on Statistical Confidentiality, No. 79 of 1993, which regulates the implementation of population and housing censuses throughout the country (arts. 5 and 6).</p>
17.7 Users are kept informed about the quality of statistical outputs.	<p>Mexico has quality standards that vary depending on the type of output. For probability surveys, a traffic light system is in place to show the different levels of accuracy of the coefficients of variation of the estimates generated:</p> <ul style="list-style-type: none"> – economic surveys: high accuracy [0%,20%), medium accuracy [20%,30%) and low accuracy (coefficients of variation $\geq 30\%$). – household surveys and surveys with other populations: high accuracy [0%,15%), medium accuracy [15%,30%) and low accuracy (coefficients of variation $\geq 30\%$). <p>For non-probability surveys, a traffic light system is in place for the coverage of the design variable:</p> <ul style="list-style-type: none"> – high accuracy ($\geq 80\%$), moderate accuracy [60%,80%) and low accuracy (<60%) <p>For administrative records, the non-response rate at the level of the variable is available for the main variables.</p>

Table III.1 (concluded)

Requirement	Replicable practices relating to the requirement in the region
Principle 18. Assuring coherence and comparability	
18.1 International, regional and national standards are used with regard to definitions, units, variables and classifications.	Mexico's INEGI has methodological documents that serve as a guide for the implementation of information programmes, such as the technical standards for the production of statistical and geographical information for the National Institute of Statistics and Geography (<i>Norma técnica del proceso de producción de información estadística y geográfica para el Instituto Nacional de Estadística y Geográfica</i>), based on the GSBPM model (see [online] https://sc.inegi.org.mx/repositorioNormateca/O_13May19.pdf).
18.3 Statistics are kept comparable over a reasonable period of time and between geographical areas.	Similarly, Colombia's DANE has its technical standards for the quality of the statistical process (<i>Norma técnica de la calidad del proceso estadístico</i>) (NTC PE 1000) (see [online] https://www.dane.gov.co/files/sen/normatividad/NTC-Proceso-Estadistico-PE-1000-2020.pdf). Chile's INE audits the use of classifications. Audits are generated to ensure that coding is carried out on the basis of the different statistical classifications applied at the institution, in different spheres and with predetermined statistical criteria (by economic activity, occupation and product). Auditing, as part of the statistical quality process, seeks to achieve continuous improvements in coding, specifically in terms of data accuracy, on the understanding that coding is an "error-prone" process, whether because of incorrect application of the nomenclature or simply because of mistakes made when the decision is taken to assign a given code, which is why it must be constantly monitored and measured. The audit process consists in the revision of category headings (usually collected in open questions) that have been previously coded, whether manually or automatically, in accordance with the specific classification implemented (ISIC4.CL 20123, ISCO 08.CL4 or CPC 2.CL5, among others). This revision is generally carried out on a sample of coded records, following international standards and the recommendations derived from the adaptation of each statistical classifier. The audit process carried out by the Nomenclature Section is performed by an expert analyst who has the task of reviewing the consistency of the category headings and of the codes sent by the statistical producer in order to then establish the compliance status of the coding, using the following categories: – Compliant: the record meets the minimum standards needed to validate the coding assigned by the statistical producer. – Compliant with observations: the coding assigned by the statistical producer can be definitely confirmed, but there are observations on the record. – Non-compliant: the record does not meet the minimum standards needed to validate the coding assigned by the statistical producer and is therefore rejected in its entirety. – In each audit, in addition to presenting the results, the Nomenclature Section provides guidelines and recommendations for coding (including a recommendation for information gathering in the next cycle) and the use of statistical classifications.
18.2 Procedures or guidelines are in place to ensure and monitor internal, intrasectoral and cross-sectoral coherence and consistency.	Certification of statistical operations by entities producing official statistics must comply with the requirements established: in Mexico, by the technical standards for the production of statistical and geographical information for the National Institute of Statistics and Geography (<i>Norma técnica del proceso de producción de información estadística y geográfica para el Instituto Nacional de Estadística y Geográfica</i>) (see [online] https://sc.inegi.org.mx/repositorioNormateca/O_13May19.pdf), and in Colombia, by the technical standards for the quality of the statistical process (<i>Norma técnica de la calidad del proceso estadístico</i>) (NTC PE 1000) (see [online] https://www.dane.gov.co/files/sen/normatividad/NTC-Proceso-Estadistico-PE-1000-2020.pdf). These technical standards establish consistency and comparability as part of the concept of quality in the assessment criteria to be followed throughout the statistical process.
Principle 19. Managing metadata	
19.1 The metadata management system of the statistical agency is well defined and documented.	Colombia, Costa Rica, Ecuador and Mexico have developed methodological documentation processes and are implementing international initiatives promoted by the World Bank and the Organisation for Economic Co-operation and Development (OECD), such as the National Data Archive (ANDA) and the standards used for the documentation and dissemination of metadata and microdata, the Data Documentation Initiative, the Dublin Core Metadata Initiative (DCMI) and the Statistical Data and Metadata eXchange (SDMX), which are part of the Accelerated Data Programme (ADP). These initiatives facilitate the application of best practices and international standards on metadata and microdata documentation and dissemination with a view to strengthening and standardizing the documentation, preservation and dissemination of the metadata associated with a statistical operation.
19.2 Metadata are documented, archived and disseminated according to internationally accepted standards.	See National Administrative Department of Statistics (DANE), <i>Guía para la implementación de los estándares estadísticos para la documentación de metadatos y microdatos (Data Documentation Initiative (DDI) y Dublin Core (DC))</i> , 2020 [online] https://www.sen.gov.co/files/guias/Guia_para_implementar_DDI_y_DC.pdf ; National Institute of Statistics and Geography (INEGI), "Red nacional de metadatos", n/d [online] https://www.inegi.org.mx/rnm/index.php/home ; and National Institute of Statistics and Censuses (INEC), "Archivo Nacional de Datos y Metadatos Estadísticos (ANDA)", n/d [online] https://anda.inec.gob.ec/anda/index.php/catalog .
19.3 Staff training and development programmes are in place on metadata management and related information and documentation systems.	Some national statistical offices, such as INEGI in Mexico and DANE in Colombia, have an annual training programme. In the case of INEGI, this programme is guided by the technical standards for the preparation of metadata for projects to generate basic statistical information and statistical components derived from geographical projects (<i>Norma técnica para la elaboración de metadatos para proyectos de generación de información estadística básica y de los componentes estadísticos derivados de proyectos geográficos</i>) (INEGI). DANE, for its part, participates in NSS training and support activities for the implementation of the guidelines used to prepare the methodological documentation in a standardized form, compiling the necessary elements throughout the different phases of the statistical process. It is also involved in training activities organized by the NSS in relation to various standards, such as the Data Documentation Initiative (INEGI and DANE) and the Dublin Core Metadata Initiative. The Nesstar Publisher software initiative also facilitates the application of best practices and international standards on metadata and microdata documentation and dissemination to strengthen and standardize the documentation, preservation and dissemination of metadata associated with a statistical operation.

Source: Prepared by the authors.

Chapter IV

Considerations for implementing a quality framework

A. Establishing a baseline in terms of compliance with quality principles

As a first step in implementing the quality assurance framework, it is considered essential for the national statistical office to assess the functioning of the NSS from its standpoint as the governing and coordinating body. In making this assessment, it is advisable for it to use the self-diagnostic instrument described in the second chapter of this guide, supported by the instructions in annex A2. In addition, as a contribution to statistical quality assurance, this assessment should be implemented from a differential, intersectional and gender perspective that includes and brings out the life situations, particularities, gaps and inequalities characterizing all population groups in each country.

Once the self-assessment process has been completed, the national statistical office will have a set of quantitative and qualitative criteria for identifying its main strengths and weaknesses in terms of meeting the requirements of the quality assurance framework. The self-assessment tool provides an overall score on a scale of 0 to 100 for each principle. This quantitative criterion can serve as a primary input for identifying the principles for which implementation levels are most critical and which therefore require priority action by the national statistical office. It is suggested that the latter establish a ranking based on this quantitative criterion, giving higher priority to principles with more critical performance levels. Once this ranking has been established, it is considered appropriate for the national statistical office to identify the requirements that are not being fulfilled and therefore require immediate action.

Using the ranking determined in the previous phase, it is important to establish a plan for complying with the framework elements, emphasizing the prioritized principles. This means setting execution deadlines and establishing implementation mechanisms, short-, medium- and long-term targets, systems for verifying achievement of the targets, and task forces to harness efforts towards implementation of the plan.

In this process of conducting the diagnostic assessment and formulating actions, it is essential to create collaborative working arrangements with other producers of statistics in the NSS. It is also vital for strategic planners at the national statistical office to be committed to prioritizing the work agenda for implementation of the framework and to providing the human, financial and technological resources that this requires.

B. Designing the statistical process

The Generic Statistical Business Process Model (GSBPM) is considered the best model for regulating the production process in statistical operations and is recommended by international organizations. Its focus on processes makes it possible to: (i) develop a common language for all types of information programme, (ii) structure and reuse practices established prior to its implementation, (iii) more easily implement gradual changes, (iv) have a framework for building and managing standardized software products, (v) more easily break down tasks to incorporate improvements, (vi) clearly identify the responsibilities of the different actors and (vii) more easily design management indicators that are comparable over time.

The following activities in particular are necessary to implement the GSBPM:

- establish technical standards that regulate the phases of the production process;
- develop a repository of supporting information for each phase of the production process;
- structure a cost model for each information programme and phase of the production process, including information programmes and statistical activities carried out in accordance with the internal programme structure and expenditure register of the national statistical office;
- provide specific training courses for individuals who contribute to a particular phase, even if they are working on different information products;
- develop conceptual guidelines to standardize criteria across the different types of information programme (censuses, surveys, administrative records, etc.) in order to secure the information needed to document different phases of the GSBPM;
- develop guidelines for harmonizing statistical production within the NSS, relating inputs and outputs for each phase and its subprocesses;
- conduct evaluations and use indicators to monitor certain phases and subprocesses.

Throughout the adoption of the GSBPM model, it is also important to have standards for the different outputs involved in the various stages of the process that incorporate minimum requirements depending on the type of information source.

For this, it is advisable for the unit in charge of quality, working in conjunction with the technical teams, to establish specific guidelines for creating or using products such as:

- **Classifiers:** determine the classifiers to be used by the institution, ensuring they are kept up to date in accordance with international standards, and specify the analyses that should be undertaken in the event of changes in the classifiers to determine their effects on the series.
- **Methodology:** establish the minimum information requirements that the methodology should incorporate according to the type of information source used, to help the user gain an in-depth understanding of the processes involved in each phase.
- **Standardized non-response variables:** establish an instrument (or variables in a collection tool that is already in use) that can be employed to classify and reduce non-response by generating and monitoring fieldwork performance indicators in operations that use statistical sources.
- **Sampling frameworks:** determine processes for updating the sampling frameworks for operations with statistical sources and decide on the inputs, methodology and schedule for reducing the bias that arises when they become obsolescent.
- **Definitions:** prepare a glossary of terms for the different topics worked on by the national statistical office, such as demographics, employment, and income and expenditure.
- **Guidelines for mainstreaming the gender perspective:** formulate guidelines, in accordance with international standards, for mainstreaming gender in the various statistical operations. As a basic principle, these should correctly characterize phenomena by gender, and they should be capable of capturing the implications of the specific phenomenon being measured for men and for women.
- **Metadata standards:** establish the standards to be applied for information that is available to users, including the Data Documentation Initiative, the Statistical Data and Metadata eXchange (SDMX) and open data, among others.

C. Making the best use of administrative records for statistical purposes

As explained above, using administrative records in the production of official statistics has several advantages, but also poses multiple challenges directly affecting the principles that assure the quality of official statistics. In view of this, some specific recommendations for the use of administrative records when generating official statistics will be presented. These recommendations arise from the work carried out with the countries in the Working Group dealing with the subject and cover different stages of progress in the incorporation of administrative records.

The challenges arise in different areas and affect multiple quality requirements. Addressing any of them requires knowledge of the administrative records available in the country. For this reason, it is first recommended that an inventory be made of the administrative records available in the NSS by subject, periodicity, target population and producer institution. This will make it possible to carry out an initial assessment of the existence or otherwise of administrative sources when new demands for information arise and to evaluate their cost-efficiency relative to existing statistical sources.

The most common challenge is poor accessibility of administrative records in cases where there is no statistical law, or the law does not establish the right of the national statistical office, as the NSS governing body, to access them. In this case, the existence of agreements or memoranda of understanding with data providers allows progress to be made in incorporating new sources.

With a view to compliance with the fundamental principles, and in the light of the region's own experience, the recommendation is to draw up agreements or memoranda of understanding that include at least the following:

- the purposes for which administrative records will be made available;
- the data to be delivered in the full database of the administrative record and the confidentiality protocols for using these data;
- the period of validity of the agreement, the delivery timetable and the measures to be applied in the event of non-performance;
- the responsibilities of the two parties:
 - in the case of the national statistical office: to provide advice on quality issues, methodologies, metadata and standardization of information;
 - in the case of the provider: to notify any changes in the database configuration representing a significant alteration in the structure of the data in the administrative record to be shared, to follow up on the standardization guidelines, to establish a clear methodology and to generate metadata as agreed with the national statistical office;
- the technical media and security procedures for the transfer of statistics.

The ability to conduct quality assessments on administrative records using measurement instruments developed for this purpose is another challenge confronting the region. The recommendation is to have available measurement instruments that ensure impartiality and objectivity in the process of generating statistical data from administrative records and that support the methodology for identifying and validating the target population of the statistics, given the potential for selection bias in the capture of administrative data and calculation of the associated non-sampling error. This will ensure the accuracy and reliability of the data.

Another factor that needs to be considered to ensure the quality of statistical data when incorporating administrative records or other data sources is the progressive use of unique identifiers for the records that are available to the national statistical office in the first instance, and subsequently to the NSS as a whole.

D. Seeking measurement modalities based on the dimensions of quality and stages of the statistical process

One of the fundamental aspects of statistical quality management is that quality should be assessed by means of different tools. The United Nations National Quality Assurance Frameworks Manual for Official Statistics identifies three levels of assessment, depending on the degree of progress achieved by each national statistical office. The first level includes the use of quality indicators, the production of quality reports and the application of user surveys. For this level, there are some recommendations that stem from good practices in the countries of Latin America and the Caribbean:

- Process mapping using the GSBPM with the aim of monitoring each phase of the statistical process. This is based on the premise that, to enhance the quality of statistical products, it is necessary to improve the statistical processes involved. The mapping consists in comparing the activities carried out in each phase of the statistical process with what is established in the GSPBM, identifying progress with its implementation.
- Preparation of quality reports based on indicators designed for continuous performance monitoring of the statistical process. The indicators can be formulated to meet different criteria, such as quality attributes or the phases of the statistical process.

For the second level, which involves self-assessment and auditing processes, the recommended actions include the following:

- The preparation of checklists that can be used to make a qualitative assessment of compliance with the requirements of the statistical operation in the light of the quality benchmark employed and its own objectives. The aim is to ensure that those responsible for the operation check that the activities involved in each subprocess of each phase have been carried out as needed to execute and monitor the statistical operation, and that this has been done under the expected statistical quality conditions. These checklists may include:
 - (i) Phase: the person in charge of the statistical operation should indicate the phase of the statistical process in which the self-assessment is being carried out.
 - (ii) Subprocess: the relevant subprocess within the phase must be selected.
 - (iii) Characteristic: the questions to be answered by the person in charge of the statistical operation for the subprocess and phase being self-assessed at the time.
 - (iv) Applicability or non-applicability to the statistical operation: the person in charge of the operation must determine whether or not the characteristic or question is applicable to it, given its characteristics and the way it has been conducted.
 - (v) Information status: this determines how the documentary information associated with the subprocess is rated against the checklist question.
 - (vi) Information name: the name of the documentary information supporting the answer to the question is given.
 - (vii) Description of the information: a brief description of the main aspects of the associated information.
- The issuing of final reports once the quality assessments have been conducted, including the preparation of improvement plans based on the results obtained. For this, it is essential to establish an assessment criterion in advance and delimit the issues to be dealt with in the final report. These may include, among other things:
 - (i) The context of the statistical operation assessed.
 - (ii) A description of the assessment (purpose, scope, period and assessment type).
 - (iii) The results of the assessment according to the criterion laid down.
 - (iv) Conclusions regarding strengths, opportunities for improvement and situations of non-compliance.

Lastly, the third level, which includes labelling and certification, is conditional on prior implementation of the tools specified for the previous levels, which will provide the elements needed to determine a more advanced assessment criterion. This criterion may consist in the construction or formulation of a technical quality standard, application of which has the following advantages:

- (i) It encourages the adoption of a process approach whereby information production is broken down into phases, which facilitates standardized measurement of information output quality.
- (ii) It establishes the minimum quality requirements for a statistical process that can be implemented in any type of organization without in any way conflicting with the management models adopted.
- (iii) It contributes to the cycle of continuous improvements in the statistical process.

For this type of standard to be implemented appropriately, the national statistical office needs to structure an assessment and certification procedure that specifies techniques and activities to guarantee confidence in the quality of what is being assessed. These include forming an independent committee to take the certification decision, specifying how long the certification is valid for and then carrying out oversight to check that the characteristics certified are maintained over time.

E. Having a risk management plan

In the countries of the region, there is a statutory requirement for public agencies to set up and maintain internal oversight and risk management systems. Consequently, some national statistical offices have a risk management policy that includes the steps needed for identifying, analysing, evaluating and dealing with risk. In some cases, such as that of Chile's National Institute of Statistics (INE), this management model is expressed in a risk matrix that is applied to statistics production processes and subprocesses. It is useful for this risk map of the statistical production process to also consider statistical quality attributes, as at Colombia's DANE. These matrices usually contain sensitive information, so it is suggested that the information be confidential and access-controlled.

National statistical offices should therefore develop a statistical process risk matrix, in six phases. First, the context should be analysed to identify risks adequately, taking account of external social, cultural, technological, legal, regulatory and other factors. Generators of risk and the threats from them, internal factors, vulnerabilities, failures and other factors that could generate risk should also be identified.

Some threats are:

- stakeholders' unawareness of the strategies, mechanisms or instruments available to them to make known their statistical information needs;
- changes in the contexts of the subject matter of statistical operations and in national and international benchmarks;
- sociodemographic changes and territorial dynamics that may cause the geostatistical framework to become outdated;
- social, economic, environmental and health emergencies that result in changes to the dates on which administrative records are provided by data sources;
- the emergence of unforeseen one-off needs;
- the reluctance or refusal of sources to provide information, or the provision of incomplete data;
- public order or health problems and natural disasters that affect or prevent the collection or storage of information;
- failure of personnel in charge of collecting or compiling information to do so;
- biases or problems related to the mainstreaming of the gender and differential approach in each phase of statistical production.

The second step is to identify the types of risks that exist, most of which are of an operational nature, and their source (where applicable). Some examples are detailed below:

- important statistical information needs that have not been identified or prioritized;
- the design and documentation of methodologies that do not meet the technical and conceptual specifications required for an understanding of the phenomenon being studied or for international comparability, or the requirements for their implementation in the subsequent phases of the production process;
- the creation of a statistical framework unsuited to the phenomenon under consideration;
- the construction of procedures, instruments, mechanisms and tools unfitted to the objectives of the statistical operation or the planned outputs;
- poor coverage and incomplete data at the end of the collection or compilation phase;
- low-quality processing results;
- results that are inconclusive or do not reflect the reality of the phenomenon under consideration;
- failure to meet the timetable for the publication of statistical outputs;
- statistical or geostatistical outputs that are difficult for stakeholders to access or understand;
- improvement actions that do little to address the weaknesses identified in the statistical production phases.

The third step must be to perform a risk analysis that should include the consequences of the risk materializing. In other words, it is necessary to evaluate the effects or impacts that would arise if the damage associated with the risk occurred, such as economic losses, effects on servers or certain processes, penalties, fines, lawsuits, cessation of activities, the need to repeat processes, delays, etc. The consequences should not be confused with the risks. In this phase of risk analysis, factors such as the probability of the damage occurring (possible, almost certain, and other categories) and the scale of the impact (slight, moderate) must also be taken into account.

The fourth step is the risk assessment phase, in which everything related to risk control must first be dealt with, such as the identification of those responsible for carrying it out, who may be managers or their delegates or those leading the statistical operation. The periodicity of the control must also be established; it may be quarterly or half-yearly, or whenever required.

This should be followed by a description of how oversight of the actions taken to mitigate or correct the risks encountered is to be carried out, e.g., by reviewing and approving the completeness of the contents and the technical and economic components of the general plan. It is also important to describe the actions that would be taken in the event that discrepancies, inconsistencies or abnormal situations were encountered during the controls. A record should be created to document the implementation of the controls.

Lastly, the results from evaluating the design of the controls should be indicated and early warnings should be put in place as preventive actions. These actions should aim to minimize vulnerabilities and should be formulated in the light of the possibility that the set of controls may be insufficiently robust. They may be geared towards implementing new controls or strengthening existing ones.

F. Documenting the National Statistical Quality Assurance Framework

Since the National Statistical Quality Assurance Framework is to be understood as a coherent and integrated system whose components guarantee the quality of official statistics, it is essential for each national statistical office to analyse, define and document its quality assurance framework, thereby consolidating in a single document the instruments and tools needed to manage and ensure the quality of statistical processes and outputs, pursuant to users' requirements and needs, so that statistical information has the attributes needed for decision-making.

The documentation of the National Quality Assurance Framework contributes to its implementation, both in the national statistical office and in the NSS, so that members are committed to continuously assessing, improving and reporting on the quality of official statistics.

G. Defining the data ecosystem of the country's official statistics

It is in the national statistical office that the quality framework is implemented in the first instance. However, the data revolution and other trends have led to the emergence of new actors and new data that have potential for statistical exploitation, and these can yield granular metrics to meet new demands such as follow-up and review of progress with the Sustainable Development Goals (SDGs). Recognizing this new operating context, it is crucial to reflect on the scope of this framework in the data ecosystem of official statistics and on the way implementation is taking place both within and outside national statistical systems.

The discussion on the data ecosystem recognizes that interaction with other government actors, the private sector, academia and the general public has been inextricably linked to the role of the national statistical office as it seeks to identify new needs and demands, capture the data needed for measurements and facilitate the use of statistics in decision-making processes. The novel feature or value of the data ecosystem concept is that it makes it possible to recognize that there are new actors playing the role of data providers in the current context, and that these need to be considered in a collaborative approach to production.

The data ecosystem concept brings out the fact that these actors (producers, providers and users) operate at both the national and the subnational levels, that they need to be identified, and that working and interaction mechanisms need to be set up to generate statistical information which incorporates new territorial, differential and intersectional approaches. This ecosystem also requires capacity-building on different levels (the system, the organization and the individual). Accordingly, national statistical offices have an increasingly active role to play in coordinating the statistical system.

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Annex A1

Requirements and elements included in the adapted version of the checklist for statistical quality self-assessment in the region

This checklist was adapted from the 2019 United Nations National Quality Assurance Frameworks Manual for Official Statistics. In adapting this checklist for Latin America and the Caribbean, only those requirements considered essential for national statistical office assessment purposes were included, considering aspects of commonality and regional importance.

Table A1.1

Level A: Managing the statistical system

Principle	Requirements	Elements
1. Coordinating the national statistical system (NSS).	1.1 A statistical law establishes the criteria for classing statistics as official in the light of the Fundamental Principles of Official Statistics.	<ul style="list-style-type: none"> – The coordination role of the national statistical office or other body is defined in a statistical law. – The statistical law specifies the requirements for official statistics and the scope of the NSS. – Members of the NSS are identified in formal regulations or legal provisions. – Responsibilities of NSS members for the development, production and dissemination of official statistics are clearly specified in the respective laws and regulations.
	1.2 There are a body and mechanisms for the coordination of the NSS for activities at the local, national, regional and international level.	<ul style="list-style-type: none"> – The national statistical office or other body is tasked with the coordination of the NSS. – The national statistical office has mechanisms to ensure the coordination (including the exchange of data and statistics within the NSS) and the quality of official statistics. – An NSS-wide (central) coordination body (which is by default part of the NSS and is typically the national statistical office) is empowered by law or normative agreements to set, monitor and review guidelines for the development, production and dissemination of official statistics. – A central coordination body establishes and maintains engagement with advisory bodies, academic institutions and other regional and international bodies as appropriate. – A central coordination body coordinates data collection to improve cost-effectiveness and reduce respondent burden, in particular with regard to coordinating sample surveys. – A central coordination body monitors the use of agreed standards, concepts, classifications and methods throughout the NSS. – A central coordination body promotes and enhances data sharing within the NSS and liaisons with members of the extended data ecosystem regarding the sharing of data. – A central coordination body promotes the sharing of technical knowledge and good statistical practices and ensures the provision of training, including on the production of official statistics and Sustainable Development Goal (SDG) indicators. – Standardized processes for the evaluation of the quality of official statistics are developed and applied within the NSS.
	1.4 There is a national plan or programme for the development and production of official statistics.	<ul style="list-style-type: none"> – There is a multi-year national plan for the development and production of official statistics, which can take the form of a national strategy for the development of statistics. – The multi-year national plan for the development and production of official statistics covers the entire NSS. – The multi-year national plan should address quality assurance. – Annual plans for the NSS members supplement the multi-year NSS-wide plan. – The multi-year national plan is established in close consultation with statistics producers, users and data providers. – The multi-year national plan for the development and production of official statistics is approved for implementation by an NSS-wide governance body and/or a higher-level government or a legislative body. – The programmes and activities of the multi-year national plan are monitored on a regular basis by the NSS-wide (central) coordination body.
2. Managing relationships with data users, data providers and other stakeholders.	2.1 The national statistical office has institutional criteria and procedures for identifying and consulting on the statistical needs, interests and obligations of users and stakeholders, analysing the demand for statistical information and identifying priorities.	<ul style="list-style-type: none"> – The statistical agencies clearly identify all their stakeholders. – Processes are in place to consult stakeholders about their concerns, interests, needs and obligations. – Stakeholders are kept informed of actions taken to address their needs and concerns.
	2.5 The national statistical office seeks to enter into agreements or other formal arrangements with information providers to strengthen the use of administrative records and to obtain appropriate access to data from other government agencies for statistical purposes.	<ul style="list-style-type: none"> – The statistical law provides appropriate provisions to guarantee the national statistical office and, if appropriate, other statistical agencies the right to obtain or access administrative data in a timely manner. – Where statistical agencies do not have a legal right to obtain administrative data, memorandums of understanding are in place that provide such access. – Statistical agencies' access to administrative data is free of charge. – Agreements with owners of administrative data are in place to operationalize data access which describe technical conditions for access and possibilities for linking the data with data from other administrative data sources. – Statistical agencies are involved in the design and development of administrative data sets in order to make them suitable for statistical purposes; this involvement extends to the possible discontinuation of such data sets.
3. Managing statistical standards.	3.1 The statistical agencies cooperate in the development and implementation of international, regional and national statistical standards.	<ul style="list-style-type: none"> – The national statistical office actively works with other statistical agencies and international and regional statistical organizations in developing, reviewing, promoting and implementing statistical standards. – The national statistical office has an organizational unit responsible for leading the development of statistical standards and for supporting statistical programmes and domains in their efforts to adopt and adapt such standards. – All relevant staff in statistical agencies are aware of statistical standards and any changes made to them. – There is a repository and a list of all standard classifications available in all statistical agencies. – The process for originating, developing and approving statistical standards involves statistics producers, data providers and data users. – The impact of the adoption of new statistical standards and classifications is assessed, documented and communicated to users; in the case of new classifications, conversion tables are provided. – The statistical agencies use conceptual frameworks, such as the System of National Accounts, that provide a basis for integrating statistical information. – Statistical standards (concepts, definitions, classifications, etc.) are regularly reviewed.

Source: Prepared by the authors.

Table A1.2

Level B: Managing the institutional environment

Principle	Requirements	Elements
4. Assuring professional independence.	4.1 A law or other formal provision explicitly declares that statistical agencies forming part of the NSS are obligated to develop, produce and disseminate statistics without interference from other government agencies or policy, regulatory or administrative departments and bodies, including from within the statistical agencies, private sector or any other persons or entities.	<ul style="list-style-type: none"> – The professional independence of the national statistical office and other producers of official statistics, such as statistical units within ministries, departments and agencies at the different levels of governments, is guaranteed by the laws and regulations under which the ministries, departments and agencies operate. – If there is no law or formal provision declaring the necessity of professional independence, there are traditions or cultures of professionalism, historical precedents or conventions that are clearly recognized as essential to the credibility of the statistical results of the statistical agencies.
5. Assuring impartiality and objectivity.	5.1 There is a law or formal provision in force, which is publicly available, that specifies that statistical agencies should develop, produce and disseminate statistics following professional standards and treat all users in the same way.	<ul style="list-style-type: none"> – Professional cultures and traditions assure the impartiality and objectivity of the statistics produced by the statistical agencies independently from the existence or absence of any laws or formal provisions. – The objectivity and impartiality of official statistics is recognized (and not disputed) by neutral observers and the public (e.g., measured by image studies).
	5.5. The administrative unit of the national statistical office has some mechanism for announcing in advance the dates and times of statistical releases, or there is a statistical release calendar, which includes the date and time (where applicable) of such releases and which is made publicly available in advance. In the event that the publication dates set out in the release calendar are not met, deviations are publicly notified in advance, together with the new release dates and the reasons for the delay.	<ul style="list-style-type: none"> – A publicly available release calendar containing all information on the releases planned by the national statistical office in the upcoming 12-month period exists. – A publicly available release calendar containing all information on the releases planned by the NSS in the upcoming 12-month period exists. – Statistics are released at the date and time (where applicable) set in the release calendar. – Changes in the release calendar are announced in advance and their reasons are explained. – The sharing of statistical results ahead of the official release (a “privileged pre-release”) is kept to a minimum, is well justified and strictly controlled and documented, and is carried out only for information purposes.
	5.6 In cases in which errors are detected, they are corrected as soon as possible, and users are informed as to how they affected the released statistics.	<ul style="list-style-type: none"> – There is a prescribed and documented policy on how to correct published data when errors are discovered. – The error treatment policy is publicly available. – Error correction for the statistical operation involved is documented and made public knowledge.
6. Assuring transparency.	6.1 The terms and conditions for producing and disseminating official statistics are available to the public.	<ul style="list-style-type: none"> – A standard procedure exists for ensuring that respondents understand the legal basis for a survey and the confidentiality provisions for the data that are collected. – Information on data sources, statistical concepts and methods used for the development, production and dissemination of official statistics are publicly available. – The information on statistical standards is available to the public. – Advance notice of major changes in methodology, source data or statistical techniques is given. – The dissemination policy is shared with the public. – Privileged pre-releases of statistical results are disclosed.
7. Assuring statistical confidentiality and data security.	7.1 Statistical confidentiality is guaranteed by law.	<ul style="list-style-type: none"> – There is a law or some other clear formal provision in force that mandates the proper management by the national statistical office of information received from respondents and data providers to ensure statistical confidentiality and data security. – There is a law or some other clear formal provision in force that mandates the proper management by members of the NSS of information received from respondents and data providers to ensure statistical confidentiality and data security.
	7.2 Appropriate standards, guidelines, practices and procedures are in place to ensure statistical confidentiality.	<ul style="list-style-type: none"> – Guidelines and instructions on the protection of statistical confidentiality throughout the statistical business process are provided to all staff of the national statistical office. – There are regular and continuous training programmes for all staff on the concept of statistical confidentiality and best practices to ensure the privacy of the information provided. – The organizational structure and arrangements for the development and implementation of practices for ensuring statistical confidentiality are adequate to cope with needs. – Staff sign confidentiality agreements upon their appointment, which are also valid after staff leave the agency.
8. Assuring commitment to quality.	8.1 The national statistical office has a quality policy that follows the guidelines of the Fundamental Principles of Official Statistics.	<ul style="list-style-type: none"> – The national statistical office’s policy on the quality of statistics and commitment to this policy are publicly known and understood. – The national statistical office promotes the shared concern for quality of all of its staff and includes information about trade-offs affecting the statistical work programme. – The national statistical office has quality guidelines that are made available to external users, at least in a summarized version.

Table A1.2 (concluded)

Principle	Requirements	Elements
8. Assuring commitment to quality.	8.2 The national statistical office promotes a culture of continuous evaluation and improvement of statistical outputs and processes.	<ul style="list-style-type: none"> – Methodology and processes are regularly documented. – Good statistical practices are exchanged among and between statistical agencies. – Procedures are in place to ensure that the required documentation on quality is regularly updated. – A quality assurance plan or similar mechanism is in place that describes the work standards, formal obligations (such as laws and internal rules) and quality control actions that prevent, monitor and evaluate errors and control the statistical production process. – Workplans, schedules and standard forms or templates are used for facilitating the updating of the documentation of quality assurance procedures and actions in a consistent way. – Statistical agencies use a national quality assurance framework as a basis for regular quality assessments (self-assessments and other assessments). – Statistical agencies use a national quality assurance framework which is based on one of the accepted global or regional frameworks. – General quality systems or frameworks such as total quality management and the International Organization for Standardization (ISO) 9000 framework are utilized in conjunction with the national quality assurance framework. – Quality initiatives of international and regional statistical bodies such as the European Statistical System are followed up, as appropriate.
	8.3 (a) There is a specific body responsible for quality management or the coordination of quality management within the national statistical office.	<ul style="list-style-type: none"> – A quality manager, committee, unit or group of coaches or advisers is assigned responsibility for quality management.
	8.3 (b) The unit responsible for quality management at the national statistical office receives necessary support and coordination to fulfil this role.	<ul style="list-style-type: none"> – An office-wide data quality task force is established and meets regularly. – Quality issues are discussed by management and with the statistical office as a whole regularly (e.g., at an annual quality review meeting).
	8.6 The national statistical office has established the use of a minimum number of indicators to ensure the quality of outputs. Indicators on statistical output quality are regularly measured, monitored, published and followed up to improve statistical products and processes.	<ul style="list-style-type: none"> – Quality indicators are defined, measured and monitored for follow-up and improvements. Examples of quality indicators include: (i) references in media, hits on websites, results from user satisfaction surveys (relevance); (ii) standard deviations and other measures of accuracy, response rates (accuracy); (iii) number and size of revisions (reliability); (iv) the length of time between the end of a reference period and the dissemination of the statistics (timeliness); (v) rate of statistics published when announced (punctuality); (vi) respondent burden.
	8.7 The national statistical office regularly and systematically monitors user satisfaction with statistical products and processes, subjecting them to regular quality reviews based, among other factors, on a combination of quality principles, standards and international experiences.	<ul style="list-style-type: none"> – Periodic quality reviews of key products and processes to assess adherence to internal guidelines and international standards are performed. – Reviewing teams are set up in which both internal and external experts can participate. – The statistical agency's internal reviewers are trained in auditing methods and tools. – Improvement actions arising from the result of quality reviews are defined and scheduled for implementation. – Top management is informed of the results of reviews so they can follow up on improvement actions. – Benchmarking of key statistical processes with other statistical agencies is carried out to identify good practices. – Procedures are in place to monitor and manage the quality of different stages of statistical production according to the Generic Statistical Business Process Model (GSBPM). – Trade-offs within quality are systematically examined (e.g., trade-offs among accuracy, timeliness and costs). – External experts (including from international organizations) conduct quality reviews, such as reviews of key statistical domains (e.g., the International Monetary Fund (IMF) Reports on the Observance of Standards and Codes) or other reviews, such as peer reviews, external audits and rolling reviews. – Regular quality reviews of key outputs and processes are conducted to assess compliance with internal guidelines and international standards.
9. Assuring adequacy of resources.	9.1 Financial, human, material and technological resources at the national statistical office (information technology, annual operating programme, procedures manuals, risk management matrix and training plan for each information programme to be carried out) are sufficient to implement the statistical work and carry out short-, medium- and long-term statistical programmes.	<ul style="list-style-type: none"> – A resource mobilization strategy such as a national strategy for the development of statistics is in place. – The annual workplan is feasible given the available resources. – Costs (staff costs and other costs) of each stage of the production process are measured.
	9.2 Planning and management principles are aimed at the optimal use of available resources.	<ul style="list-style-type: none"> – Information technology is employed to increase efficiency. – Standardization, integration and automatization of statistical production and dissemination are pursued to increase efficiency of operations and to save costs.

Source: Prepared by the authors.

Table A1.3
Level C: Managing statistical processes

Principle	Requirement	Elements
10. Assuring methodological soundness.	10.1 (a) The methodologies established for each stage of the statistical operation to be carried out by the national statistical office are consistent with international standards and the Fundamental Principles of Official Statistics.	<ul style="list-style-type: none"> – Methodologies are reviewed and assessed against available data sources and updates in available national, regional or international statistical processes. – Sampling design is based on sound methodologies and population data that are as up-to-date as possible. – Statistical editing procedures and imputation methods are based on sound methodology known to users.
	10.1 (b) The methodologies established by the national statistical office are publicly known, thoroughly documented, regularly revised and updated as needed.	<ul style="list-style-type: none"> – The statistical office has an organizational structure that ensures it can develop and apply sound statistical methods at the various stages of the statistical process and for the various statistical operations. – Methodologies are public and contain all the details of the statistical process, ensuring comparable, consistent, coherent and replicable processes. – Proper follow-up procedures are planned and implemented in cases of non-response. – Statistical offices review the methods used by independent agencies for the compilation of data and the production of statistics, if they have the authority to do so.
	10.2 The national statistical office has an annual training programme for its staff and recruits technical staff with qualifications commensurate to the function they are to perform. Technical specialization programmes suited to the area of development are carried out.	<ul style="list-style-type: none"> – Staff of the statistical agency are recruited on the basis of their academic background, qualifications and experience. – All qualification requirements are specified for every post. – Training and development programmes are in place to ensure the staff acquire and continuously update their methodological knowledge. – Staff skills are regularly updated so that staff are able to utilize new data sources and tools and can easily change positions. – Attendance of staff at relevant training courses and at national or international conferences is encouraged.
	10.3 The national statistical office chooses data sources taking particular account of factors such as timeliness, cost-effectiveness and reliability.	<ul style="list-style-type: none"> – The use of alternative sources of data, including existing surveys and censuses, administrative data, big data or other sources of data, is constantly evaluated if the opportunity arises. – Quality has to be assessed when using administrative data or other data sources for statistical purposes. Ideally, when using administrative data, it should be assured that the population covered by the records is consistent with the statistical output requirements, that the classifications used are appropriate, that the concepts underlying the records are appropriate, that the records are complete and up to date, that the geographical coverage is complete and that the measurement units are appropriately defined and identified. – When using other unstructured data sources (such as big data), the specific methodological challenges such as those linked to the statistical population and the veracity and volatility of such data have to be considered.
	10.4 Administrative records (as an alternative data source to surveys) and sampling frames are frequently evaluated and adjusted.	<ul style="list-style-type: none"> – A systematic approach is in place for updating the survey frames in both census and inter-census periods to ensure accurate coverage of the target population. – For all surveys, the appropriate statistical population frames are updated regularly. – Information gathered during the conduct of surveys is used to assess and improve the quality of the frame, especially with regard to its coverage and the quality of the contact variables and the auxiliary information (variables used in the sampling design).
	10.5 The national statistical office cooperates with the scientific community to improve methods and promote innovation in the development, production and dissemination of statistics.	<ul style="list-style-type: none"> – Collaboration with the scientific community is in place, for example through conferences, workshops, task forces and training courses, to discuss relevant methodological and technological developments (e.g., with regard to exploiting new data sources). – There are agreements in place with academic institutions on cooperation and the exchange of qualified personnel. – Staff at the statistical office collaborate on methodological issues with colleagues at the international level. – Regular participation and presentations at relevant national and international conferences is encouraged for the exchange of knowledge and experiences.
11. Assuring cost-effectiveness.	11.1 The costs of producing all individual statistics are measured and analysed, and mechanisms are in place to assure the cost-effectiveness of statistical processes.	<ul style="list-style-type: none"> – There is a system for registering cost and time used for all statistical products, and estimating time used on the main processes should be possible. – The costs of producing the statistics are well documented at each stage of the production process and are regularly reviewed to assess the effectiveness of their production. – Cost-benefit analyses are carried out to determine the appropriate trade-offs in terms of data quality. – The need for each survey variable to be collected is justified by virtue of the objectives and uses of the statistical operation. – There is an ongoing review process that considers whether a particular output is still operating in the most cost-effective way to meet its stated objectives and uses. – Data collection instruments are designed to minimize the respondent burden and processing cost and time, while maximizing the necessary information capture.
	11.2 The national statistical office has procedures in place to assess the relevance of emerging statistical demands, including cost analysis.	<ul style="list-style-type: none"> – Demands for new statistics are assessed with regard to the relevance of the objectives of the statistical operation, information availability and associated costs, and are discussed by management, based on inputs from users and in cooperation with other stakeholders.

Table A1.3 (continued)

Principle	Requirement	Elements
11. Assuring cost-effectiveness.	11.3 Procedures exist to assess the continuing need for all statistics, to determine whether any can be discontinued to free up resources.	<ul style="list-style-type: none"> – There are regular discussions by management on the usefulness of all statistics; the discussions include inputs from users, such as the results of user satisfaction surveys. – The usage of different statistical products, including statistical databases, is monitored and assessed to evaluate their relevance. – Users and stakeholders are informed and consulted about the possible discontinuation of statistical outputs.
	11.4 Modern information and communication technologies (ICTs) are applied to improve the performance of statistical processes.	<ul style="list-style-type: none"> – An appropriate ICT strategy exists and is regularly reviewed and updated to improve the effectiveness and efficiency of the statistical processes. – The ICT architecture and hardware infrastructure are regularly reviewed and updated, and possibilities for innovation and modernization are identified. – Routine clerical operations and statistical processes (e.g., data capture, coding, data editing, data validation, data exchange) are automated where possible and are regularly reviewed.
	11.5 Proactive efforts are made to improve the statistical potential of administrative data and other data sources.	<ul style="list-style-type: none"> – Statistical agencies provide input to the legislative process to obtain and maintain access to administrative and other data sources for statistical purposes, if needed. – Arrangements are made and the legal and technical elements are in place to generate appropriate agreements with owners of administrative data and other data collections (e.g., service-level agreements or national legislation) specifying access to and flows of data and metadata and other relevant aspects. – An assessment of possible administrative data sources is carried out prior to launching any new survey. – Data linking and integration methods are proactively pursued while ensuring data security and privacy. – Quality reports for administrative and other data used for official statistics are established by the responsible statistical agency in cooperation with the data owners or holders.
	11.6 The national statistical office develops strategies that promote the implementation of integrated and standardized production systems.	<ul style="list-style-type: none"> – The statistical agencies have developed strategies to move to a more integrated and standardized statistical production system within their organization. – The statistical agencies promote, share and implement standardized solutions that increase effectiveness and efficiency. – The statistical business architecture of the statistical agency is based on international standards and tools such as the Generic Statistical Business Process Model (GSBPM), the Generic Activity Model for Statistical Organizations (GAMSO), the Common Statistical Production Architecture and the Statistical Data and Metadata eXchange (SDMX).
12. Assuring appropriate statistical procedures.	12.1 Statistical processes are tested before implementation.	<ul style="list-style-type: none"> – The testing strategy is developed as part of the design phase of the statistical business process model. – Data capture procedures and data collection tools and instruments such as electronic questionnaires are tested to ensure simplicity and minimal intrusion on privacy, and are adjusted if required before their implementation. – Survey questionnaires are tested using appropriate methods (e.g., pilot survey, focus groups, etc.). – Collection systems for administrative and other data are tested before use. – Data treatment and data processing procedures are tested and adjusted, if required and possible, prior to their actual application, on the basis of previous experience with the statistical operation and pilot survey results, among other things. – The evaluation of the pilot survey is taken into account for improvements and implementation of the statistical operation production process. – In the case of integrating data from one or more sources, the quality of the linkage procedures is tested.
	12.2 The national statistical office regularly and systematically monitors statistical processes for each information programme generated. Each stage of the statistical process is established on a scientific and documented basis and is monitored in a framework of continuous improvement of the quality of the statistical operation.	<ul style="list-style-type: none"> – The statistical agencies have standardized, consistent, clear, accessible and transparent procedures and guidelines for all the steps of the statistical production process. – Documentation of production processes should follow the GSBPM. – A policy for archiving data and statistics is in place and is followed. – Statistical procedures employ internationally recognized statistical techniques. – Data from all data sources are reviewed and validated to identify potential problems, errors and discrepancies such as outliers, missing data and miscoding. – The effects of data editing and imputation are analysed and are part of the public information of the statistical operation, as part of assessing the quality of the data collection. – All statistical databases are designed and arranged in a way that allows and facilitates data linkage, using unique identifiers for statistical units as appropriate while ensuring data security and privacy.
	12.3 Procedures are in place to effectively use administrative and other data sources for statistical purposes.	<ul style="list-style-type: none"> – Statistical offices use tools and guidelines known to users to assess the quality of the data from administrative and other data sources. – Appropriate processes and software applications for the collection, processing and analysis of data from administrative and other data sources that will be used for statistical purposes have been developed and implemented. – Owners or holders of administrative and other data sources inform the statistical offices of any changes in the data production process. – Metadata related to administrative or other data sources are available to the statistical agencies, including concepts and definitions, classifications, coverage compared to target population and other methodological aspects. – Documentation exists that describes how data from administrative and other sources meet the statistical quality requirements in terms of definitions, concepts and coverage, among other things.

Table A1.3 (concluded)

Principle	Requirement	Elements
12. Assuring appropriate statistical procedures.	12.4 Revisions of statistical operations follow standard and transparent procedures, in accordance with their type.	<ul style="list-style-type: none"> – A revision policy, guidelines or principles exist, are made public and are followed. – Revisions of the published statistics are accompanied by metadata that provide necessary explanations.
	12.5 Metadata and documentation of methods and different statistical processes are managed throughout the processes and shared as appropriate.	<ul style="list-style-type: none"> – Policies and standards for maintaining and updating metadata exist and are followed. – Work on preparing statistics and their related metadata should be done in parallel. – Metadata are captured throughout the statistical business process following the GSBPM and stored in a metadata management system.
13. Managing the respondent burden.	13.1 The information requested in a statistical survey is limited to what is necessary to meet the survey objectives.	<ul style="list-style-type: none"> – The availability and suitability of existing data (data from other surveys and administrative or other data sources) are explicitly considered before suggesting a new survey. – The collection of any data elements that are identical or similar to those collected in another survey is limited to what is considered necessary for verification and possible data linkage purposes. – When possible, surveys or parts of the information to be collected in the surveys are extracted or derived from available administrative registers. – The burden on respondents is measured and included in a set of quality indicators and in the quality reports.
	13.2 Mechanisms are in place at the national statistical office to promote the value and use of statistics to respondents and the importance of the information captured by the statistical operation in encouraging truthful and timely responses by respondents.	<ul style="list-style-type: none"> – Information packages that provide respondents with important and necessary information about the survey and explain the value of official statistics are made available. – Respondents are provided with the final reports or results of the census or sample survey in which they participated. – Initiatives with community groups, schools, business advocates and other stakeholders are undertaken to raise awareness of the value of official statistics. – Electronic products are developed that give necessary statistical information to information users (businesses and individuals), and these products are promoted through initiatives with communities and respondents. – Social media are used to promote participation in surveys and censuses. – Standard practices are in place to obtain feedback from respondents and to respond to their requests and complaints in a regular manner.
	13.3 Sound methods, including information and communication technology (ICT) solutions, are used in surveys to reduce or distribute the respondent burden.	<ul style="list-style-type: none"> – Appropriate sampling techniques are used to minimize sample sizes while achieving the target level of accuracy. – Sample surveys are coordinated to distribute the burden on respondents. – Multiple modes of collection are offered to collect respondent data, including electronic surveys. – Collection of data is done at the most appropriate time in view of the information flow expected.
	13.4 The national statistical office promotes data sharing, data linkage and the use of administrative and other data sources between its information-producing departments to minimize respondent burden.	<ul style="list-style-type: none"> – Documentation of data already available within the NSS, including archived data, exists and is shared with information users. – Technical tools for data sharing and data linkage within the NSS (e.g., formal agreements, web services, common databases) exist. – Data repositories are shared among statistical agencies for the production of official statistics and in compliance with confidentiality policies. – Information on the quality of data to be linked exists (e.g., on coverage and linkage possibilities). – Use of administrative and other data as an alternative to survey data for producing official statistics is promoted throughout the NSS.

Source: Prepared by the authors.

Table A1.4
Level D: Managing statistical outputs

Principle	Requirements	Elements
14. Assuring relevance.	14.1 Procedures are in place to identify users and their needs and to consult them about the content of the statistical work programme.	<ul style="list-style-type: none"> – There is legislation or some other formal provision which includes an obligation to consult with the main users of the statistics. – Structured and periodic consultation processes (e.g., advisory councils and committees or working groups) with key stakeholders and users are in place to review the content of the statistical programme and the usefulness of existing statistics, and to identify requirements for new statistics. – Feedback from a user support service, call centre or hotline is analysed to understand and identify user needs. – Data on the use of statistics (e.g., web analytics, number and types of downloads, subscribers to reports) are collected and analysed to improve statistical outputs.
	14.2 Users' needs and requirements are balanced, prioritized and reflected in the work programme.	<ul style="list-style-type: none"> – Users' priority needs are met and reflected in the work programme of the statistical agency. – Procedures are in place to prioritize various user needs in the work programme and strategic goals. – Data on the use of statistics are analysed to support the setting of priorities. – A periodic evaluation of the work programme is carried out to identify emerging needs and those whose priority has diminished. – Processes are in place to monitor and consult with stakeholders on the relevance and practical utility of existing statistics (with regard to scope, level of detail, cost, etc.) according to current and emerging user needs.
	14.3 Statistics based on new and existing data sources are being developed in response to society's emerging information needs.	<ul style="list-style-type: none"> – An innovation laboratory is established to consider and experiment with new data sources to meet emerging information needs. – Cooperation with the scientific community and owners or holders of new data sources is established to experiment with and pioneer the use of these data sources. – Possibilities of exploiting new data sources are regularly discussed by the management of the statistical office.
	14.4 User satisfaction is regularly measured and systematically followed up.	<ul style="list-style-type: none"> – User satisfaction surveys and user studies are regularly carried out and the results assessed and analysed. – Improvement actions arising from the user satisfaction surveys and user studies are identified and implemented. – User satisfaction surveys include questions on the opinions of users about metadata availability. – Measures to assess the satisfaction of main users with particular products are in place (e.g., specific user satisfaction surveys and indicators, including timeliness, etc., at the product level).
15. Assuring accuracy and reliability.	15.1 Source data, integrated data, intermediate results and statistical outputs are regularly assessed and validated.	<ul style="list-style-type: none"> – Standards-based systems for assessing and validating source databases, integrated data, intermediate results and statistical outputs are developed and managed. – Data are systematically checked and compared with data from other sources and over time. – Results of statistics are compared with other existing information in order to ensure validity.
	15.2 Sampling errors are measured, evaluated and documented. Non-sampling errors are described and, when possible, estimated.	<ul style="list-style-type: none"> – Procedures and guidelines are available on how to measure and manage (e.g., reduce or balance) statistical errors. – Sources of possible sampling errors are identified and described. – Sampling errors are measured and evaluated. – Non-sampling errors (errors in data sources, response errors, coverage errors, errors linked to measurements, processing and analyses, etc.) are identified, described and evaluated. – Sampling and non-sampling errors are analysed to identify improvement measures. – Information about the sampling and non-sampling errors is made available to users as part of the metadata.
	15.3 Studies and analyses of revisions are carried out and used to improve data sources, statistical processes and outputs.	<ul style="list-style-type: none"> – Preliminary and revised data and statistics are clearly identified. – Explanations about the timing, reasons for and nature of revisions are made available. – The revision policy follows standard and transparent procedures in the context of each survey. – Information on the size of and reasons for revisions to key indicators is used to improve statistical processes. – Information on the size of and reasons for revisions to key indicators is provided and made public.
16. Assuring timeliness and punctuality.	16.1 The timeliness of the statistical office's statistics complies with international standards or other relevant timeliness targets.	<ul style="list-style-type: none"> – The timeliness of the statistical agency's statistics complies with the dissemination standards of international organizations such as the International Monetary Fund (IMF) or other relevant timeliness targets (e.g., requirements for the 2030 Agenda for Sustainable Development in relation to attainment of the SDGs). – Divergences from international timeliness targets are monitored and, if the targets are not met, actions are taken to ensure compliance with them. – The overall trade-offs between timeliness and other dimensions of quality (e.g., accuracy, cost and respondent burden) are given consideration when setting targets.
	16.2 The relationship with data providers is managed with regard to timeliness and punctuality needs.	<ul style="list-style-type: none"> – Agreements are in place with data providers on the planned delivery dates and delivery format. – Procedures are in place to ensure the effective and timely flow of data from providers to statistical agencies. – Follow-up procedures are in place to ensure the timely receipt of data from providers.
	16.3 Preliminary results can be released when their accuracy and reliability are acceptable.	<ul style="list-style-type: none"> – The possibility and necessity of releasing preliminary data is evaluated, while also considering data accuracy and reliability. – When preliminary statistics are released, they are clearly identified as such. – Users are provided with appropriate information on the quality of the preliminary statistics. – Preliminary results are revised according to the established revision policy. – Final results are clearly distinguished from preliminary results.

Table A1.4 (continued)

Principle	Requirements	Elements
16. Assuring timeliness and punctuality.	16.4 Punctuality is measured and monitored according to planned release dates, such as those set in a release calendar.	<ul style="list-style-type: none"> – Punctuality or the rate of punctuality (i.e., the rate of statistics published on time) is measured according to the release calendar. The finalization of the release calendar should occur at least three months in advance of the publication of the relevant statistics. – Information on the punctuality of the released statistics is discussed by management and made available to users.
17. Assuring accessibility and clarity.	17.1 Statistics are presented in a form that facilitates proper interpretation and meaningful comparisons.	<ul style="list-style-type: none"> – Statistics are presented in a clear and understandable manner. – Guidelines that describe the appropriate content and preferred formats and style (layout and clarity of text, tables and charts) of an agency's outputs are available to authors of statistical publications and databases. – Published statistics are open for free use, provided that reference is made to the responsible agency. – Up-to-date methodological documents (on concepts, scope, classifications, basis of recording, data sources, compilation methods and statistical techniques), as well as quality reports and the work programme of the statistical agency, are made available to the public. – Explanatory texts accompanying the statistics (technical or methodological notes, technical annexes, etc.) are reviewed for clarity and readability. – Comparisons of data are included in the publications when appropriate. – Preliminary and revised data are identified and explained in published statistics. – The most important metadata needed to understand and use the statistics are published together with the statistics. – A policy for archiving published statistics is in place.
	17.2 A data dissemination strategy and policy exists and is made public.	<ul style="list-style-type: none"> – The public is made aware that custom-designed outputs, statistics not routinely disseminated and longer time series can be provided on request when feasible, and it is instructed on how the data can be ordered. These outputs are made public if possible. If this is not possible, special response or processing channels are available, or there should be a strategy on responding to the public without breaching confidentiality criteria. – Catalogues of publications and other services are made available to users. – While official statistics are normally free and accessible for everyone, statistics that need to be produced on request might have a cost corresponding to the extra work they require. The pricing of special requests is fully transparent. – A strategy has been developed and agreed upon with stakeholders for the release of anonymized data and microdata.
	17.3 Modern information and communication technology (ICT) is used for facilitating easy access to statistics.	<ul style="list-style-type: none"> – Statistics are disseminated in various ways suitable for all users, with the statistical office's website providing a central entry point. – Users are able to extract groups of data from statistical databases through public interfaces in the most appropriate and common formats (xlsx, csv, html, etc.). – Statistical data can be accessed quickly and with simple linkage through an application programming interface (API) from an online application that can be consulted on different devices. – Statistics are disseminated in ways that facilitate redissemination by the media. – Agreements with key users are established for the efficient and regular transmission of statistics and data. – Technical solutions for access to anonymized data or microdata access mechanisms are available. – Explicit consideration has been given to trade-offs between the accessibility and confidentiality of statistics (i.e., the level of detail in tables).
	17.4 Access to microdata is allowed for research purposes, subject to specific rules and protocols on statistical confidentiality that are posted on the statistical office's website.	<ul style="list-style-type: none"> – The statistical agency controls or monitors the access of researchers to microdata by providing the microdata in a secure environment. – Researchers are regularly consulted about the effectiveness of the microdata access arrangements. – Remote access facilities are available for accessing microdata, with appropriate controls.
	17.5 The national statistical office has a specific strategy and mechanisms in place to make the different channels available for accessing statistical information publicly known.	<ul style="list-style-type: none"> – The statistical agencies have a strategy to manage media relationships and maintain regular contact with the media. – The statistical offices arrange regular training and outreach events for journalists. – The statistical agencies arrange training for students on how to use statistics. – Producers and users are encouraged to publish articles on statistical issues and how statistics should be used properly.
	17.6 The national statistical office has a dedicated focal point that provides support to users in a timely manner.	<ul style="list-style-type: none"> – User support services are available to give prompt assistance to users to help them access and interpret the data. – User support services are appropriately staffed to support a wide range of users.
	17.7 Quality assessments of statistical outputs are publicly available to users.	<ul style="list-style-type: none"> – Standards are defined for quality reports, harmonized for the statistical operations of the national statistical office. – Published statistics are accompanied by standard quality reports, including information on the periodicity of the statistics, data sources, production methods and quality (i.e., accuracy and reliability, timeliness and punctuality, coherence and comparability, accessibility and clarity). – Results from quality assessments or reviews are made public.

Table A1.4 (concluded)

Principle	Requirements	Elements
18. Assuring coherence and comparability.	18.1 International, regional and national standards are used with regard to definitions, units, variables and classifications.	<ul style="list-style-type: none"> – Statistical offices promote the adoption of national, regional or international statistical standards. – Guidelines, a common repository of statistical concepts, definitions of units and variables, and classifications and other mechanisms exist. – Compliance with international, regional or national standards for statistical production is periodically assessed. Any deviations from these standards are identified and included in the metadata, along with reasons for such deviations.
	18.2 Procedures or guidelines are in place to ensure and monitor internal, intrasectoral and cross-sectoral coherence and consistency.	<ul style="list-style-type: none"> – Statistics derived from different sources or with different periodicities (e.g., monthly, quarterly, yearly) are compared and any differences are explained and reconciled, as appropriate. – Cooperation and the exchange of knowledge among individual statistical programmes and domains is promoted. – Process-specific procedures and guidelines are available to ensure that outputs are internally coherent. – Before new statistics or statistical programmes are launched, the conceptual and methodological relationship with existing statistics is analysed. – Statistical outputs are compared with results of other statistical or administrative sources that provide the same or similar information on the same subject matter, and divergences are identified and explained to users. – Internal procedures or guidelines are developed in order to ensure and monitor internal coherence and consistency. – Procedures and guidelines are developed in order to ensure that results from different sources can be combined. Compliance is periodically assessed.
19. Managing metadata.	19.1 The metadata management system of the national statistical office is well defined and documented.	<ul style="list-style-type: none"> – A strategy, guidelines and procedures are in place for metadata management and dissemination. – Metadata management is recognized as the responsibility of all staff involved in the statistical operation.
	19.2 Metadata are documented, archived and disseminated according to internationally accepted standards.	<ul style="list-style-type: none"> – International, regional, national or internal standards are used for metadata documentation, management and archiving. – Procedures are in place to ensure that metadata are documented according to standardized metadata systems, and are regularly updated. – Metadata are made available at the same time as the data and statistics to which they pertain. – A systematic way to archive metadata is available that also ensures that the metadata are accessible for reuse in the future. – A glossary of statistical concepts is publicly available.
	19.3 Staff training and development programmes are in place on metadata management and related information and documentation systems.	<ul style="list-style-type: none"> – Process managers are trained to properly document the data and describe the relevant processes.

Source: Prepared by the authors.

Annex A2

Instructions for self-assessment using a checklist for statistical quality in the region⁸

- (1) Self-assessments are comprehensive, systematic and regular reviews of an organization's activities carried out by the organization itself (see paras. 4.16 and 4.17 of the United Nations National Quality Assurance Frameworks Manual for Official Statistics) (United Nations, 2019). Self-assessments can differ in purpose and scope. In the case of official statistics, a self-assessment may cover the whole national statistical system (NSS), only the national statistical office, other statistical agencies, a specific statistical domain, a particular data source or certain statistical operations.
- (2) This checklist is primarily intended to be used for the assessment of the NSS from the point of view of the coordinating agency (usually the national statistical office) at the institutional level and mainly for internal purposes.
- (3) The purpose of this self-assessment is to detect areas of strength and weakness (and risk), and subsequently to identify possible improvement actions. The self-assessment is expected to be followed by the development and implementation of an improvement plan. The self-assessment checklist can also help in monitoring the progress of the national statistical office. The self-assessment is not an audit and is not designed for the final score to be compared with those of others. At the same time, it is recognized that the score can have positive and motivating effects and be useful for tracking progress. To achieve the purpose of the self-assessment, use of the column for strengths and weaknesses or other comments is strongly recommended.⁹
- (4) The self-assessment should be conducted by a group of staff from different levels of management and should involve experts in the field from across the statistical agency in order to mitigate the risk of an overly subjective and positive interpretation, to detach it from the current situation and to help create a common vision. Documentation, metadata and independent verification of data are other measures that can help address the risk of subjectivity.
- (5) This self-assessment checklist is designed for quality assessments to be conducted regularly (every year or at most every two years is the recommendation) and rigorously, with the aim of identifying actions for improvement. However, it can also be used to provide an initial assessment as part of a scoping exercise or for learning purposes, to introduce national statistical office and NSS staff to quality assurance tools. The checklist is based on the United Nations National Quality Assurance Framework.
- (6) This self-assessment checklist was developed by the Expert Group on National Quality Assurance Frameworks and uses the National Quality Assurance Framework as a benchmark (see chapter III and annex A1). The United Nations National Quality Assurance Framework aims at assuring quality at four levels, ranging from overarching institutional and cross-institutional management and statistical production processes to outputs (United Nations, 2019, paras. 3.1–3.6). The United Nations National Quality Assurance Framework, which consists of 19 principles and 87 underlying requirements, is oriented towards the national statistical office as the coordinating body of the NSS. Some principles are not as important for statistical agencies other than the national statistical office. Below is a summary of the levels and principles that make up the National Quality Assurance Framework. The contents of the checklist have been adapted for Latin America and the Caribbean.

As noted above, each principle is associated with fulfilment of a number of necessary requirements. In turn, the requirements are assessed by measuring compliance with the elements to be assured. In the regional adaptation of this checklist, for practical purposes, only the “Elements to be assured” sheet has to be completed in the Excel file. This assessment will be used to automatically calculate the degree of compliance with the requirements to be assured from the sheet entitled “Checklist” and to obtain a score per principle and an overall compliance score in the National Quality Assurance Framework.

⁸ The self-assessment checklist is available in Excel format, in an unedited Spanish version, at [online] <https://rtc-cea.cepal.org/es/herramientas-metodologicas/cuestionario-de-autoevaluacion-de-la-gestion-de-los-sistemas>.

⁹ The self-assessment can also use a “maturity model” as set out in ISO 9004:2018, which distinguishes different levels of achievement. While this checklist does not incorporate the maturity model, users can identify different levels of achievement and improvement actions of their own, according to their specific circumstances.

- (7) The first step in completing the checklist is to assess the elements to be assured by completing the “Elements to be assured” sheet. The degree to which the elements are fulfilled can be rated using four categories: “Full compliance”, “Partial compliance”, “Non-compliance” and “Not assessed”. However, it is not necessary to assess all the elements included, but only those marked as mandatory on the sheet. The “Mandatory” column shows whether an element has to be assessed; if the element is marked “No”, then it need not be assessed and the “Not assessed” option should be ticked instead. This will be necessary at a later stage in order to obtain an overall score for compliance with the principles making up the Framework.

It is suggested that the rating of the elements be based on the following criteria:

- (i) “Full compliance” means that what is prescribed in the element has already been implemented and there is little room for improvement.
- (ii) “Partial compliance” means that the element is not being fully addressed, and significant improvements are required to comply.
- (iii) “Non-compliance” means that progress on implementation of the element described is minimal, and urgent action is required.

The implementation of a given element may also consist of the implementation of an equivalent activity or practice. It is important for comments describing why elements are complied with or not to be obtained. These comments can be helpful for preparing plans of action, and can also serve as a benchmark for a future self-assessment exercise.

- (8) The assessment of the requirements is formulated automatically. Once all the elements to be assured have been assessed, it will be seen that the requirements have been rated accordingly.
- (9) As indicated, the self-assessment is carried out at the level of the elements so that an assessment can automatically be obtained for the requirements to be assured. These elements are consistent with the requirements of each principle.

Annex A3

Glossary of terms used in this guide

Application programming interface (API): a programming interface for statistical data that enables users of statistics to integrate data from a statistical agency into their own systems, combine them with their own data and create services, applications and visualizations. Data automatically become available to users whenever the statistical agency updates.

Classification: a set of discrete, comprehensive and mutually exclusive observations that can be assigned to one or more variables which will be measured in the collation or presentation of the data. In the Statistical Data and Metadata eXchange (SDMX), “Classification systems” refers to a description of the classification systems being used and how they conform with internationally accepted standards guidelines, or good practices. It also refers to the description of deviations of classification systems compared to accepted statistical standards, guidelines, or good practices, when relevant. The terms “classification” and “nomenclature” are often used interchangeably, despite the definition of a “nomenclature” being narrower than that of a “classification”.

Common Statistical Production Architecture: a system covering statistical production through the information elements and processes identified by the Generic Statistical Information Model (GSIM), the Generic Activity Model for Statistical Organizations (GAMSO) and the Generic Statistical Business Process Model (GSBPM).

Continuity: refers both to the adequacy of resources and to the regulatory framework enabling the statistical operation to be conducted on a permanent basis.

Credibility: the trust users place in statistical products because they perceive that they are produced in a professional manner, in accordance with appropriate statistical standards, and that policies and practices are transparent.

Data and statistics: statistics are numerical information relating to an aggregate of data on units or observations. In general, this Guide uses the term “statistics” when referring to an output of a statistics production process and the term “data” when referring to an input or possibly throughput in the statistics production process (the term “data” includes microdata which, depending on the context, can be also an output).

Data ecosystem: a system in which a number of actors interact with each other to exchange, produce and utilize data. On a simple definition, a system can be understood as a set of connected parts forming a complex whole. There are multiple other definitions of a data ecosystem. The United Nations Development Programme model consists of data producers, data objects, infomediaries (i.e., media and other commercial information services) and data users, while other models put the national statistical office-led national statistical system at the centre of a system that consists of government agencies, academia and research institutions, the private sector, civil society and international and regional organizations.

Data providers and statistics producers: this guide distinguishes between data providers, who provide an input to the statistics production process (such as respondents and holders or owners of statistical, administrative and other forms of data), and statistics producers, who produce a statistical output. Depending on the specific context, when using the term “data provider” this guide refers only to holders or owners of data.

Data sources: this guide distinguishes among three data sources according to their purpose and by the entity responsible for their compilation: (i) statistical data sources such as surveys, (ii) administrative data sources and (iii) other data sources. In general, other data sources include data sources associated with the term “big data” unless already included, in some instances, in statistical or administrative data sources. New data sources can often be associated with other data sources; however, they may be considered part of statistical or administrative data sources as well, depending on national circumstances.

Efficiency: attainment of the maximum yield from a given level of resources in carrying out an activity.

Generic Activity Model for Statistical Organizations (GAMSO): a model that extends and complements the Generic Statistical Business Process Model by modelling additional activities that support statistical production.

Generic Statistical Business Process Model (GSBPM): a model that describes the processes used for the production of statistics, including the specification of needs, design, building, data collection, processing, analysis, dissemination of the products and evaluation of the process.

Generic Statistical Information Model (GSIM): an internationally agreed set of definitions, attributes and relationships that describe the pieces of information used in the production of official statistics.

Interpretability: the ease with which users can understand, use and analyse data, considering their scope.

Intersectional, differential and gender approach: an analytical perspective that serves to obtain and disseminate information on population groups with particular characteristics by considering, for example, their age or stage in the life cycle, gender, ethnic or rural origin, and disability status, in order to bring to light particular life situations and gaps and to guide public and private decision-making. It also serves to identify the simultaneous presence in people of two or more of these differential characteristics, which in a given historical, social and cultural context increase the burden of inequality and produce experiences that differ substantively between people.

Metadata: data that define and describe other data. Structural metadata and reference metadata can be distinguished from each other. Structural metadata define and accompany the data and consist of identifiers and descriptors that are essential for discovering, organizing, retrieving and processing a statistical data set (e.g., titles, subtitles, short descriptions, dimension names, variable names, etc.). Reference metadata are of a more general nature and describe statistical concepts and methodologies used for the collection and generation of data and provide information on data quality, thereby assisting users with the interpretation of the data. Unlike structural metadata, reference metadata can be decoupled from the data (i.e., they can be generated, collected or disseminated separately from the statistics to which they refer).

National Quality Assurance Framework (NQAF): a coherent and holistic system for statistical quality management that assures trust in and the quality of official statistics.

National statistical office: the leading statistical agency within a national statistical system. “National statistical office” and “national statistical institute” mean the same thing. In general, the national statistical office has a coordination role within the national statistical system and is responsible for the development, production and dissemination of official statistics across multiple statistical domains.

National statistical system (NSS): the ensemble of statistical organizations and units (statistical agencies) within a country that develop, produce and disseminate official statistics on behalf of the national government (and other levels of government). It is the responsibility of each country to define the scope of its NSS (see also “statistical agencies”, “data providers and statistics producers” and “data ecosystem”).

Official statistics: statistics that describe, on a representative basis, economic, demographic, social and environmental phenomena of public interest. Official statistics are developed, produced and disseminated as a public good by the members of the NSS in compliance with the Fundamental Principles of Official Statistics and accepted quality frameworks such as the United Nations National Quality Assurance Framework, as well as other internationally agreed statistical standards and recommendations. In many countries, official statistics are defined and described in the statistical programmes.

Open data: digital data that are made available with the technical and legal characteristics necessary for them to be freely used, reused and redistributed by anyone, at any time, anywhere. There are many similarities between the statistical quality principles of the United Nations National Quality Assurance Framework and the criteria for open data used in the Open Data Charter, such as timeliness and comprehensiveness, accessibility and usability, and comparability and interoperability.

Other statistics producers: entities that do not produce official statistics and are normally not members of the NSS. Other statistics producers have to be distinguished from other producers of official statistics, who are members of the NSS (see also “Statistical agencies”).

Plan-Do-Check-Act cycle: a systematic way of thinking of quality and performance improvements starting with planning a change, implementing it, monitoring the process and resulting outputs against the objectives, and taking actions to improve performance, as necessary. The cycle was popularized by W. Edwards Deming.

Principle, requirement, element to be assured: a principle is a general proposition, or procedure, to which statistical agencies and organizations are committed and that will guide them in meeting their quality-related objectives. A requirement is something needed in order to ensure the implementation of the United Nations National Quality Assurance Framework in chapter III. An element to be assured is a specific aspect of the National Quality Assurance Framework that identifies possible activities, methods and tools to meet the requirement. In this sense, an element to be assured reflects a good practice that is observed to work well in one or several national statistical offices or other producers of official statistics, and thus is a candidate to be promoted for use in other statistical agencies.

Quality: the degree to which a set of inherent characteristics of an object fulfils requirements. A simple definition of quality is “fit for use” or “fit for purpose”. It is the users’ needs that define the quality. Different users may have different needs that must be balanced against each other.

Quality assessment: the part of quality assurance that focuses on an assessment of how well quality requirements (the stated needs or expectations) are fulfilled.

Quality assurance: a planned and systematic pattern of all the actions needed to provide adequate confidence that a process and a product conform to stated requirements.

Quality management: the set of systems and frameworks in place within an organization to manage the quality of statistical products and processes. In the case of a national statistical office and other producers of official statistics, quality management also includes managing the statistical system and the institutional environment, as applicable. Quality management includes quality assurance, but the terms are often used interchangeably; quality management is a more overarching concept, while quality assurance implies a greater focus on concrete actions.

Quality policy: a document that defines top management’s commitment to quality. A quality policy statement should describe the overall quality orientation of an organization and clarify its basic intentions. Quality policies should be used to generate quality objectives and serve as a general framework for action. Quality policies can be based on the ISO 9000 Quality Management Principles and should be consistent with the organization’s other policies.

Respondent burden: the effort, in terms of time and cost, required for respondents to provide satisfactory answers to a survey.

Respondents: enterprises, authorities, individuals and others from whom data and associated information are collected for use in the production of statistics.

Revision: a change in a value of statistics released to the public. Changes can be the result of errors, but normally the term “revision” is reserved for planned changes in published numbers. Statistics can be revised when more and better source data become available, or because of a change in methodology.

Risk management: the identification, analysis, assessment, control and avoidance, minimization or elimination of unacceptable events.

Source data: data collected (from respondents, administrative entities and other data providers) by members of the national statistical system to be used in the compilation and production of official statistics.

Standard: a normative document, established by a consensus and approved by a recognized body, that specifies rules, guidelines or characteristics for common and repeated use in relation to activities or their results with the aim of achieving the optimum degree of order in a given context.

Statistical agencies: the members of the national statistical system (NSS) are known as “statistical agencies” and include the national statistical office and other producers of official statistics. In general, statistical agencies other than the national statistical office are geared primarily towards purposes and tasks other than the production of official statistics, and only a section or a small group of persons within the institution produces statistics.

The process and output quality requirements are the same for all official statistics. In the case of a ministry or administrative agency that is not exclusively tasked with the production of statistics as a mission activity, however, the requirements associated with the institutional environment only apply to the section engaged in the production of official statistics. Thus, while the ministry or administrative agency is generally not independent, the unit within the administrative agency responsible for producing statistics must decide how to produce and when to disseminate its statistics independently.

Statistical Data and Metadata eXchange (SDMX): an international initiative that aims at standardizing and modernizing (“industrializing”) the mechanisms and processes for the exchange of statistical data and metadata among international organizations and their member countries.

Statistical purpose: tasks aimed at developing, producing and disseminating official statistics, including experimenting and testing.

Statistical standards: standards define and establish uniform specifications and characteristics for products or services. In the context of this Guide “statistical standards” refers to a comprehensive set of statistical concepts, definitions, classifications and models, methods and procedures used to achieve the uniform treatment of statistical issues within or across processes and across time and space.

Transparency: the information context in which data are provided to users, together with metadata (explanations, documentation, quality information that may limit the use of the data).



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