

Official Statistics – a general overview

Chapter 02





Official statistics provide a factual basis for the assessment and decisions on economic, social and environmental issues at all levels of society. Indeed, official statistics are core information to evaluate and formulate policies and monitor measures that national authorities may undertake to influence developments and improve the prevailing situation. This Chapter comprises a summary of the major topics covered in the Handbook, insisting on the institutional and organizational frameworks as well as governance mechanisms securing trust, independence, professionalism and quality of official statistics.

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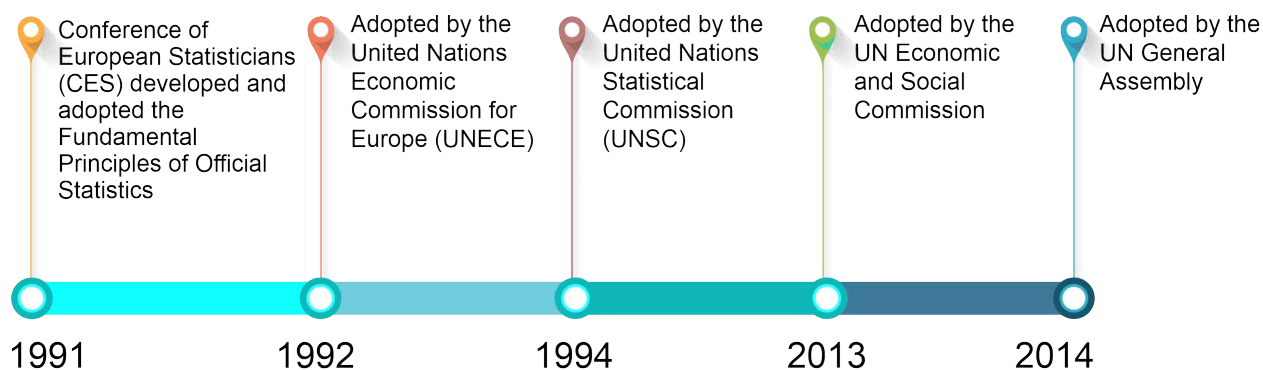
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2.1 Official statistics

In most countries, national authorities undertake to compile, process, and publish, systematically and regularly, numerical information – statistics – on the various phenomena affecting the development and well-being of people. These are termed official statistics and aim to describe the demographic, economic, environmental, and social development and situation in a given country. They are concerned with measuring and analysing the progress of nations – or the lack of it.

Official statistics provide a factual basis for assessment and decisions on economic, social and environmental issues at all levels of society. Thus, government and politicians use the statistics to evaluate and formulate policies and measures that national authorities may undertake to influence developments and improve the prevailing situation – overall or in specific areas. Official statistics are also the basis for businesses to evaluate the economic situation and allow them to make informed business decisions. They also allow the media, various organizations, and the community at large to assess situations and developments and formulate their opinions and attitudes thereon. In all member states of the United Nations, the national authorities recognise their duty and responsibility to provide their people regularly with statistical information on the state of their countries.

2.2 The international dimension



In the international arena, official statistics are unique in the sense that, starting from the early 1990s, most countries of the world have come to recognise and abide by specific ground rules for official statistics and how they are to be conducted. These rules are set out in the United Nations Fundamental Principles of Official Statistics (UNFPOS). These were originally developed by the Conference of European Statisticians (CES) at the beginning of the 1990s. They were adopted by the United Nations Economic Commission for Europe (UNECE) in 1992, by the United Nations Statistical Commission

(UNSC) in 1994, by the UN Economic and Social Commission in 2013, and the UN General Assembly in 2014.

International statistical cooperation, however, has a much longer history. That history started in Europe in the 1850s when statisticians from a few European countries started to meet at conferences discussing statistical methods and standards. This cooperation was cemented with the establishment of the International Statistical Institute (ISI) in 1885. The ISI was and is a society of professional statisticians, many of whom were and are leaders in statistical activities and methodological development in their countries. The European conferences in the 1850s and the ISI itself from 1885 became the main forum for the international statistical cooperation until the First World War disrupted it. After the War, government cooperation in official statistics was formalised under the auspices of the League of Nations with the first inter-governmental conference being held in 1929. After the founding of the United Nations, the international statistical cooperation became the responsibility of the UN, centred in the UN Statistical Commission (founded in 1946, first convened in 1947).

Thus, modern official statistics are the outcome of a long-standing and close international cooperation and consultation on statistical methods, standards, procedures and practices. This cooperation continues unabated and is carried out in different fora all over the world.

2.3 Basis of official statistics

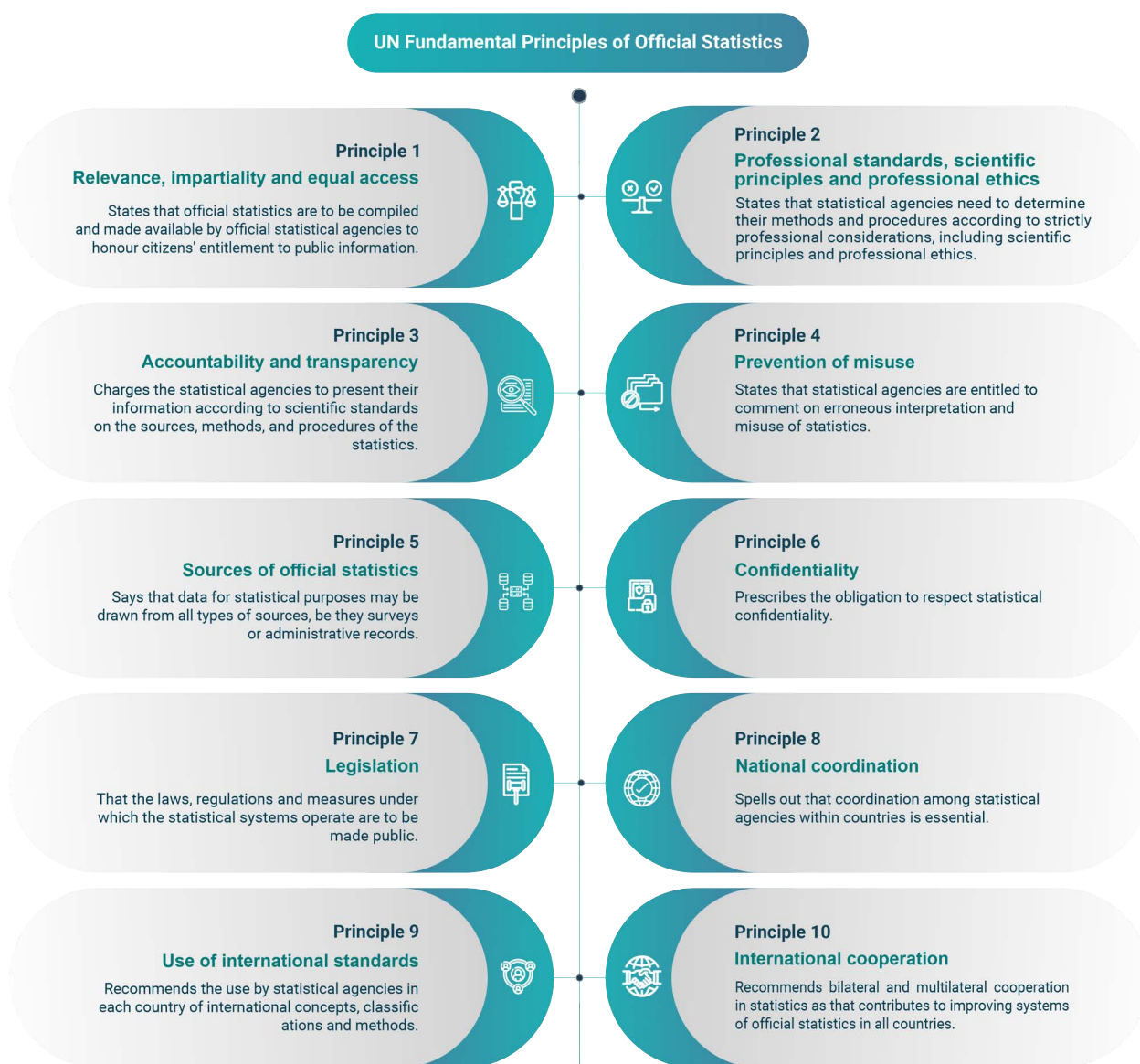
Official statistics were originally thus named because they were produced by national statistical offices (NSOs) and other specialised institutions on behalf of national authorities – governments – in the different countries of the world.

The term official statistics has come to refer not only to the producers of the statistics but also to the fact that their activities and outputs are expected to conform to a set of international standards and norms as regards their relevance for the phenomena they are supposed to describe, their quality, impartiality, transparency and coverage.

Following the remarkable convergence of official statistics in countries across the world, culminating in the generally accepted UNFPOS, a modern definition of official statistics reflects this common ground and the principles governing the conditions for and production of the statistics. Hence, official statistics are currently defined as statistics developed, produced and disseminated by the national statistical systems of countries

in conformity with the United Nations Fundamental Principles of Official Statistics, internationally agreed statistical standards, codes and recommendations as well as applicable national legislation and programmes.

As mentioned above, the UNFPOS provide the ground rules for the conduct of official statistics. The UNFPOS are composed of a preamble on the fundamental importance of official statistics and ten principles on the conduct of these.



2.4 National statistical offices and national statistical systems

In most countries, the main activities and the leadership in official statistics are entrusted to a government agency specialised in the field. In very many countries and in this handbook, this agency is called the **national statistical office (NSO)**. Different

countries use different names, such as a central statistical office (CSO), national statistical institute (NSI), or some other name that indicates that the office is public and that it is charged with statistical issues that concern the nation as a whole. Other public agencies may work on official statistics alongside the NSO, such as statistical departments or units of government ministries. This very much depends on the areas of responsibilities of the departments and ministries. In some countries, the specialised departments and ministries, like ministries of education, health, labour and transport, to name a few examples, may develop statistics on their subject alongside their main functions of formulating and implementing policy and performing their administrative duties. Moreover, ministries of finance may be responsible for government finance statistics, partly or wholly. It is also quite common that central banks are responsible for monetary and balance of payments statistics. In many countries, the NSO has been entrusted with the bulk of official statistics irrespective of domains in its capacity as the specialised statistical organization. In those cases, the ministries, departments, and agencies, (MDAs) are often essential data sources for the official statistics compiled by the NSO.

Historical and institutional reasons can often explain the division of labour between the NSO and the different ministries and departments. Still, it may also be the result of deliberate policies. While there are no specific norms or rules for that, two main issues need to be observed in all cases:

- that no matter where they are carried out, the statistical activities are very specialised and require specific skills and expertise besides the subject matter knowledge, and
- irrespective of the division of responsibilities, there is a need for close cooperation between the NSO and other producers of official statistics in the MDAs.

There are several reasons for the need for cooperation: It is necessary to ensure that the coverage of the official statistics is adequate, both as regards subject matters and geographic coverage. There is also the need to avoid duplication of collection of data and other statistical activities. It is also necessary that all official statistics are based on scientific methods and standards and that they have a common base of agreed and established concepts, classifications, and procedures. Otherwise, there is a danger that the official statistics are fragmented, that there is confusion as to their coverage, quality, and applicability, and that they are not comparable, over time, within and between countries.

The **national statistical system (NSS)** of a country comprises the national statistical office and all other producers of official statistics in the country. The governing and coordination arrangements of the NSS vary from country to country. These arrangements may be legally binding and required by the statistical laws of the country, or they may be somewhat informal and pragmatic. The cooperation may also be centred around the statistical programmes for the entire NSS. In many countries, the arrangements for cooperation are reinforced by formal agreements, such as memoranda of understanding (MoUs) setting out in detail the role and responsibilities of the different partners. Close cooperation between the NSO and other producers of official statistics is strongly recommended in international fora and is exercised in most countries.

Most countries recognise the role of the NSO in providing the professional leadership of the NSS. The NSO is the designated specialised statistical agency of the government. Official statistics are its main – and often only – concern. It is expected to have the greatest oversight over the needs for official statistics and the extent to which they are satisfied. Moreover, the NSO is most often the country's representative in the international statistical cooperation with the responsibility of ensuring that international standards and recognised scientific methods and procedures are followed.

That role of leading the NSS includes taking the initiative in coordinating activities of all institutions involved with the aim that the official statistics follow the UNFPOS, specifically including that international statistical methods and standards are applied, and the users are provided with timely and reliable statistics. In some countries, the coordination is based on formal or semi-formal consultations or meetings between the NSS partners, convened by the head of the NSO. In many countries, as mentioned above, cooperation and coordination are centred around the annual statistical programme of the country, in which the parts played by the NSO and the different institutions are set out. Most often, the cooperation within the NSS takes place at different levels of the organizations. Thus, the main decisions and agreements, such as the priorities of the statistical programme and the modes of cooperation, are taken by the head of the NSO in consultation with the other producers of official statistics in the MDAs. The detailed cooperation is then carried out by statistical professionals in different subject matter areas in the different institutions. Thus, the NSS is most often a network of professionals in many institutions working on the statistical programme of the country and official statistics in general along agreed lines of cooperation and division of responsibilities.

In developing countries, statistical development programmes financed by international institutions and other development partners emphasise as a rule how important it is that there is a functional NSS in the country within which statistical cooperation is coordinated and carried out regularly. In the absence of an NSS, they may aim to help countries establish and operate such a system. Hence, medium-term programmes, like the national strategies for the development of statistics (NSDS) advocated and often facilitated by the Partnership in Statistics for Development in the 21st Century ([PARIS21](#)) and other development partners, are invariably directed at the official statistics of the country through the NSS. Thus, such programmes require full cooperation and coordination by the NSO and the NSS partners.

2.5 The role of the chief statistician

In most countries, the head of the NSO plays a key role in the official statistics and the statistical system of the country. Most governments have assigned to the head of the NSO the role of being the main caretaker of their official statistics and representing the country in international statistical fora. The title of the NSO head varies considerably between countries, based on the traditions and rules of their administrative systems. Some titles of the head of the NSO are Director, Director-General, National Statistician, State Statistician, Government Statistician, President, and Chairman (of a state committee of statistics). A common international term for the head of the NSO in a country is **chief statistician**.

The chief statistician is the main guardian of the official statistics of the country, ensuring that they are carried out on an impartial basis according to the statistical law of the country and the UNFPOS, free from political and other unprofessional infringement. The chief statistician is responsible for leading and developing the official statistics of the country, for harmonising them internally and externally, and for coordinating the NSS. In an NSO and an NSS that are professionally independent in line with the UNFPOS, the chief statistician has sole responsibility for selecting methods, standards and procedures as well as for ensuring that these are applied uniformly by all relevant NSS institutions.

This should, of course, be done in consultation with all other relevant producers of official statistics. Apart from that, the chief statistician is limited in this selection because he is at the same time committed, often by law and generally by the UNFPOS

and his country's participation in international statistical cooperation, to adopt and apply internationally agreed methods, standards and procedures.

The role of the chief statistician is, to a considerable extent, based on the UNFPOS. Notwithstanding the concise rules of the UNFPOS and the responsibility they assign to the chief statistician of a country, it is crucial that an appropriate legal framework is in place to support the role of the chief statistician as custodian and prime mover of the statistical system of a country. A model for a national statistical law has been developed and promoted by the UNECE¹ and eventually translated by ECLAC² and ESCWA³ into their respective regional contexts. Such legislation should spell out the main role of official statistics and hence the chief statistician. But it also needs to spell out the obligations of the government in establishing and operating an NSO with sufficient infrastructure, staffing and funding. NSOs in many countries are notoriously underfunded. This is all the more serious as demand for statistics is continuously rising, for example, due to the adoption of the SDGs and their accompanying indicators. It is one of the duties of the chief statistician to explain this to the government and advocate for appropriate funding and working environment for the official statistics of the country.

To carry out this role successfully, the chief statistician must be proactive. He has to instigate a dialogue with the government on the need for statistical information and statistical services and their funding. He should explain the need for applying a uniform set of methods, standards and procedures throughout the NSS, advocate that practice, and strive to ensure that the agreed standards are followed diligently in all official statistics of the country. One main duty of the chief statistician is to guard against political and other unprofessional interference. NSOs and other producers of official statistics in some countries are frequently requested to deviate from their normal work procedures, to accentuate some data or some findings, discard or suppress others. Such requests and pressures are often clothed as being necessary for some so-called "national interest". The chief statistician has duties that extend beyond those of serving the government or the political forces of the time; he has the duty to the users of statistics, in general, to see to it that the statistics are compiled, processed and released consistently, with full transparency and integrity, comparable over time and between countries, following established international and internal practices. That is the only national interest in this respect.

1. Generic Law on Official Statistics (GLOS) [\(↗\)](#) and Guidance on Modernizing Statistical Legislation [\(↗\)](#)

2. Generic Law on Official Statistics for Latin America [\(↗\)](#)

3. Guide on the Generic Law for Official Statistics in the Arab Countries [\(↗\)](#)

2.6 Statistical confidentiality

NSOs have a long tradition of keeping their data confidential. In developed statistical systems of democratic countries, it has been standard practice for a long time to respect the confidentiality of individual data and ensure that information that is collected or acquired for statistical purposes is used solely for those purposes and no other. These cardinal rules of statistical confidentiality and privacy are set out in clear terms in Principle 6 of the UNFPOS: “Individual data collected by statistical agencies for statistical compilation, whether they refer to natural or legal persons, are to be strictly confidential and used exclusively for statistical purposes.”

This has several implications. One is that the main focus is on publication of aggregate statistics and that individual data is rarely disseminated and then only after being anonymised, i.e. cleaned of individual identifiers. Another consequence is that the individual data is kept confidential within the NSO and not handed out to other authorities. Furthermore, care is taken in tabulation that microdata on persons, households and businesses cannot be traced, directly or indirectly, back to specific persons, households, and businesses.

Observing confidentiality of individual data can be said to be first and foremost a mindset of the management and staff of the NSO and other producers of official statistics. This is also the first rule that all new statistical staff are taught – that the individuals and businesses supplying the data have a right to confidentiality and that their data is to be handled as confidential and with respect. Therefore, NSOs in organising data collections of individual data promise and publicly make it clear that they will ensure confidentiality and will not release or provide access to the individual data that can be identified. It follows from this that the statistical producers must take great care when analysing and storing their microdata. It is recommended that microdata is stored either anonymised or without individual identifiers. Some NSOs carry out the anonymisation of all microdata immediately after processing. However, it is considered important to conserve anonymisation keys in some instances to link data over time or between datasets at a later date.




If confidentiality is not observed, the trust that data providers place in the NSO is eroded, which in turn undermines the willingness of people and businesses to provide data. Many statistical agencies have a procedure for making this clear to staff by having all new staff members agreeing to and signing a confidentiality statement whereby they pledge to keep all individual data confidential and not to release or hand over confidential microdata they work with, or become aware of, in performing their work. It is recommended that such pledges are renewed at a few years' intervals.





The implication of the rule of confidentiality that individual data may not be handed over to other authorities is not difficult to explain and teach but may be stressful to uphold in some exceptional circumstances. The 6th Principle of the UNFPOS is particularly helpful in such situations, particularly after the Principles were unanimously adopted by the UN General Assembly in 2014.

Ensuring that information published in statistical tables cannot be directly or indirectly traced to individual persons or businesses can be somewhat difficult. Such difficulties have in recent years been solved by statistical methods and techniques which involve suppressing in the published tables any values that might be traced back to the individual subjects to which the data refers.

2.7 Who are the users of official statistics?

Official statistics are there to be used. Conversely, statistics that are not used should not be compiled. But who are the users and what are their needs for statistics? Users of official statistics are frequently divided into several groups according to their purpose for using the statistics. The main groups are the following:

 <p>Government</p>	<p>This includes the policy and lawmakers in the national government and in the legislative assembly, civil servants in MDAs as well as in regional and local government. These are the largest users of the official statistics. Their main uses are for gaining knowledge of developments in the various fields of society, supporting the formulation and implementation of policies and measures as well as monitoring the actions taken to assess if and to what extent they are producing the planned results. This applies to all kinds of political planning and implementation; annual and medium-term economic planning, such as for preparing the government agenda, the central government budget; policies and planning in the social sector, for health services, education and labour market measures; and in the environment sector to lay short and medium-term plans and decide on measures and actions.</p>
 <p>International and regional organizations</p>	<p>Closely related to government uses of statistics are those of international and regional organizations. Those uses are dictated by the mandates of the various organizations and the participation of the countries in international cooperation and programmes.</p>
 <p>Businesses</p>	<p>Businesses are intensive users of official statistics. Their interest is planning and running their business activities in light of the observed and expected economic developments. They use official statistics to assess the economic situation and for deciding on their business plans – for “evidence-based decision making”. Similarly, trade unions and labour market organizations use official statistics for assessment purposes and planning their labour market policies.</p>

 <p>Media</p>	<p>Media are important users of official statistics and one of the main channels for communicating statistical information to the various actors in society and the public at large. It is their role to report on main developments in society, assess the economic, social, and environmental situation and generally act to hold government and public and private sector players accountable for their actions.</p>
 <p>The academic, research and education community</p>	<p>The academic, research and education community uses official statistics in various ways. Universities and higher-level schools use official statistics in their teaching activities. Universities and research institutions use various types of official statistics in their research. While government, businesses and media are mainly users of aggregate data and statistical indicators, more detailed information is often needed in academic and applied research, even at the most detailed level of microdata.</p>
 <p>Non-government organizations (NGOs)</p>	<p>Non-government organizations (NGOs) and civil society need official statistics to gauge the need for their activities and determine where to focus their attention and services.</p>
 <p>The public at large</p>	<p>The public at large has a right to be served with official statistics to be able to assess situations and developments for themselves. Of course, this group of users is the largest, the most diffused and dispersed and probably the least focused. Particularly for those reasons, it is the duty of the NSOs and other producers of official statistics to see that the needs of the public for official statistics are taken care of.</p>

2.8 Maintaining close relations with users

The NSO and other producers of official statistics need to plan and carry out their statistical production and services to satisfy different user groups' needs. Thus, the

statistical programmes should be based on demand for the statistics – be “demand-driven”. Hence, the statistical agencies must study, map, and monitor the different needs and demand. This may be done in several ways.

Internally, the producers of official statistics face demand from their various users, both for broad level statistics and for specific data sets. To learn of such demands and monitor them, the NSOs and the other producers have to establish and maintain close relations with their users. This can be done in various ways.

Some countries operate statistical advisory councils composed of user representatives of various institutions and groups, such as ministries and other heavy users from government, labour market organizations, academia, and research institutions as well as representatives of civil society.

The mandate of the statistical councils is most often to work with the chief statistician of the country and advise the NSO and other producers how to respond to user demand and help set priorities for the statistical production in light of the demand. Many NSOs operate user groups in various domains. Their mandate is most often that of working with middle management and experts of the NSO and other producers on the provision of statistics in the different domains. In many countries, user groups are found to be valuable users-producers fora to discuss the coverage and quality of the supply of statistics, the need for new statistics, and the extension of the current compilation into new or emerging fields.

All NSOs and other producers of official statistics participate in international statistical cooperation. Consequently, they face demands for specific statistics from international statistical agencies of which they are members or partners in cooperation. In many instances, this originates from the commitments made by their governments as members of international bodies and participants in cooperation. A large part of the regular statistical production of NSOs and their NSS partners is based on such commitments. This applies to the basic economic statistics like national accounts, foreign trade statistics, government finance statistics and monetary statistics. In social statistics, most countries are committed to render regular statistics on their population, and various aspects of social conditions, such as poverty, health, education, employment, and gender equality. In recent years, countries have undertaken to compile and publish various kinds of environment and energy statistics through international agreements and cooperation. Many countries have recently committed themselves to

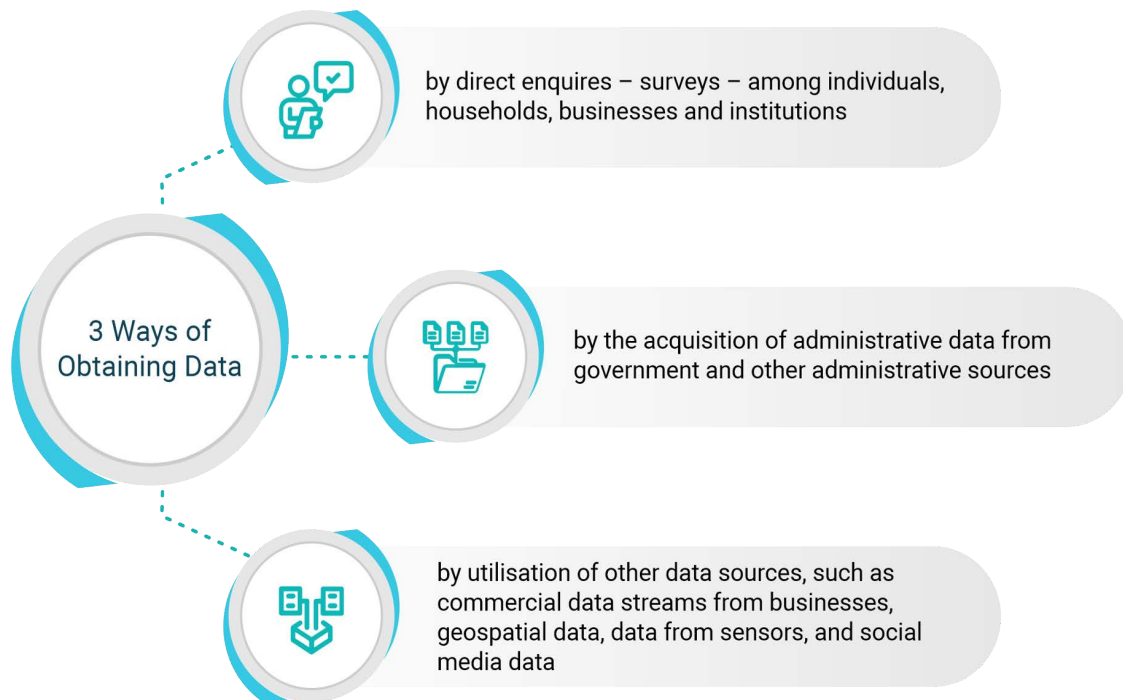
supply statistics for the sustainable development agenda, which has greatly added to their statistical programmes.

In addition to having country commitments, NSOs may, and many do, take advantage of international cooperation to learn from what neighbouring countries are doing in terms of official statistics and how they are managing to extend their programmes beyond their international commitments.

The NSOs, and in some cases their NSS partners, operate dissemination departments that are responsible for the release of statistical results and reports and communicating with users. Such departments are usually responsible for the websites that have become a major if not the main choice of the NSOs and other producers for publishing their statistical findings and products. Websites are also an important means for communicating with users, seeking their feedback and views on their demand and level of satisfaction, and gauging their needs and priorities. Data portals are recent additions to digital dissemination tools. These are web-based, interactive data platforms that provide access to one or more databases containing statistical indicators. With growing digitalisation of governments, data portals have become an important means of making statistics available within government and the public.

2.9 Data for official statistics

Official statistics are based on information, mostly numerical – statistical data – that the NSO and other producers collect or acquire from various sources and in various ways. Basically, there are three ways in which data is obtained:



The first category is termed survey data and is defined as primary data as it is obtained for the specific purpose of statistical compilation. Administrative data is collected by administrative authorities for their administrative operations but made available to the NSO for statistical purposes. Hence, administrative data is defined as secondary data as the primary purpose for its collection is administrative but not statistical. The third category, commercial data streams from businesses and data from other sources, is also secondary data. Most so-called “Big Data” falls within this category.



A traditional method for collecting data for statistical purposes is to obtain the data directly from people, businesses and institutions – respondents – by surveys, i.e. by requesting the respondents to submit information for specific statistical purposes. The surveys can either be total counts termed censuses in which the whole of a given population is surveyed, or they can be based on representative samples of the population to be surveyed – sample surveys. The best known and oldest censuses are the population and housing censuses which are conducted primarily to obtain information on the population of a country or a given territory, its size and composition, living conditions, gainful activity, work etc. Population and housing censuses may also be carried out for obtaining benchmark information for renewing frames for household surveys. In the economic sector, censuses may also be conducted to map the level and composition of economic activity. These are referred to as economic censuses. Survey-based censuses are both large and expensive undertakings. Sample surveys are much lighter and less expensive than censuses, and

they are, therefore, the preferred method of surveying as their results are sufficient to gauge developments, trends, and situations. Sample surveys, however, may not be sufficient to satisfy the demand for detailed information on small areas or population sub-groups. Hence, it may be inevitable to resort to census taking to provide detailed disaggregation at the required quality level.

Until quite recently, censuses and sample surveys used paper questionnaires for collecting data. However, this practice has been reduced, even discontinued, in many countries and replaced by modern technology – using digital questionnaires uploaded on laptops, tablets, or mobile phones, or via the Internet. Paper questionnaires require, besides paper and printing, that the information collected by them is coded and classified, and checked for errors before it is, often manually, entered into a digital database. Using digital questionnaires carries hardware and software costs, but this is nowadays lower than the cost of paper and printing. The use of digital questionnaires has also involved significant improvements in survey technology. Thus, the digital questionnaires are usually augmented by automatic coding and logical checks which greatly enhance the quality and consistency of the data. Another important development is that this technology often makes it possible – and feasible – to capture the exact geolocalisation of the surveyed statistical unit – such as household, dwelling, plot, or establishment. Finally, the data entered in the digital questionnaire is sent over the internet or the telephone network and uploaded onto the database in the NSO. All of this has greatly enhanced the efficiency, quality and richness of surveys. Using digital questionnaires and digital means of collecting data has, therefore, become the preferred method of data collection in censuses and surveys.

Although much lighter than censuses, sample surveys are still quite costly, particularly for countries with small populations, due to the relatively large sample size required for obtaining representative results. Survey-based censuses are, as mentioned above, always extensive and expensive operations.



For these reasons, NSOs and other producers of official statistics in some countries, particularly in Northern Europe, started a few decades ago to acquire data for statistical purposes by utilising **administrative data**. As the experience of utilising such data grew, and the methods and procedures became established and known, this practice has been adopted in many countries. This development has been partly a direct result of cuts made in the budgets of NSOs in many countries simultaneously as the demand for regular and timely statistics has been growing rapidly. Examples of administrative data utilised in many countries are tax data

for economic statistics, including national accounts, customs data for foreign trade statistics, social security data for statistics on living conditions, civil registration data on demographic changes, business registration data for establishing and maintaining business registers, and administrative data on migration, education, health, labour, transport, and tourism.

Much of the administrative data is used directly for statistical purposes, but it may also be used for creating frames for sample surveys. A good example of this is the statistical business register (SBR) which is usually based on administrative data on businesses. It may also be based on mixed sources, an economic census and administrative data. The SBR is a structured database on businesses, maintained on a regular basis, supported by specific software. It is used by the NSO to create frames for business surveys and sometimes as a direct source of information on the number and kind of businesses, by location, size, economic activity and more. Another example is the statistical farm register (SFR) which in many countries is based on an agricultural census (often taken every ten years) and administrative data. Yet another example is a household address register which may be generated from census or administrative information. All such registers may be augmented by additional information collected through sample surveys with the registers as frames.



Concomitant with the digitisation of economic activities and transactions, possibilities have opened for capturing very large volumes of data from businesses and other sources. Such data is often termed **Big Data**. Technically, such data can be captured by accessing and tapping data from the databases of firms and institutions by electronic means. This has been done in a few countries in the last few years for obtaining very detailed data on inputs, outputs, prices and business transactions. Such data has been utilised for economic statistics and price statistics, e.g. price indices. A recent source of data on land and land use, earth observations collected by satellite imagery and requiring Big Data methodology for processing, is a potentially rich source of data for environment statistics, agricultural statistics, transport statistics, etc. A very promising Big Data source is cell phone information for compiling various statistics on mobility and communication such as for transport and tourism statistics. Related developments in this respect involve capturing data from social media content and transactions.

2.10 Comparing modes of data acquisition

It is of interest to list and discuss the main advantages and disadvantages of the three main data acquisition modes discussed above and the feasibility for the producers of official statistics in utilising them. Starting with surveys and survey-based censuses, the main advantage is that the data is in advance, defined for statistical purposes. The data collection is organised to respond precisely to the need for data and statistics about specific phenomena. It also follows that successions of surveys on specific matters carried out at specific intervals, monthly, quarterly, annually or at other intervals, can be kept fixed, entailing that the different surveys are basically comparable over time. Furthermore, new variables can be added to capture new issues, and some existing ones cut as they become obsolete. Against these advantages weighs the substantial cost of carrying out surveys and survey-based censuses.

Advantages	Disadvantages
<ul style="list-style-type: none"> ■ The main advantages of utilising administrative data are the relative ease and low cost of acquiring the data, given that the NSO and the other producers of official statistics are granted access to the administrative data or provided with the data regularly. ■ Another advantage is that the statistical producers can compile their statistics based on administrative sources quite quickly and regularly, once the data has been defined, agreed on and organised. ■ Yet another advantage is that by using administrative data, the statistical producers avoid having to request data directly from individuals, households, firms etc. This is found to be of increasing importance as in many countries, the survey tolerance of respondents has diminished markedly and led to difficulties in direct canvassing of households and firms and reduced response rates. 	<ul style="list-style-type: none"> ■ The main disadvantage of using administrative data is that it is collected for administrative use and may not be a good match for the statistical needs of given issues. Thus, the administrative variables often do not correspond to requested statistical variables and may not be immediately organised into the statistical classifications applied for the relevant issues. In such cases, the administrative data may not be sufficient and must be augmented by statistical surveys. Labour force statistics are a good example of this as available administrative data in many countries does not satisfy the data needs as agreed internationally and required for domestic monitoring and policy purposes. For this reason, labour force sample surveys are still carried out in most countries.

A general requirement for using administrative data is that administrative systems have been developed and are available for statistical purposes. The more developed these are and the more embedded they are into the workings of the societies, the easier and more feasible it is to replace surveys with administrative data capture. Conversely, using administrative data for statistical purposes is less feasible in countries with poorly

developed administrative systems. In a few countries, civil registration systems are operated based on unique identification numbers of persons that are used in the entire administrative system. Similarly, there are business registration systems that apply unique registration numbers of firms. In these countries, the utilisation of administrative data is greatly enhanced, particularly as this allows linking data from the different administrations for statistical purposes. It has to be borne in mind, however, that such data linking has to be exercised carefully and may be restricted for reasons of ensuring full confidentiality of the data and the need to respect requirements for privacy of individuals, households and businesses.

Their novelty and the richness trigger the interest in making use of other data sources (Big Data). This is thought to open up possibilities for acquiring data on new phenomena in various fields, such as in commerce, communication, and social media, that may allow new or extended analysis of economic and social matters. It has been found, however, that harnessing some of these sources is easier said than done. For statistical purposes, some sources are poorly defined, insufficiently structured, or lacking consistency and comparability. Another factor is that it has proven quite difficult in many countries to obtain permission from firms to access their databases and data streams, as the firms prefer to keep their business transactions confidential. Nonetheless, it seems likely that various types of new data sources will be further harnessed by developing novel methods, applications, and algorithms for this specific purpose.

2.11 Time and space dimensions of data

The dimension of time has always been essential in official statistics. Data is collected in a way that allows the statistics to be analysed over time, showing developments and trends, and allowing comparisons between different periods or points in time. Periodicity and regularity are thus main preoccupations of official statistics – the statistical producers aim to provide their statistical outcomes at appropriate but short intervals and with specific regularity.

Official statistics have also always been related to a specific space, most often linked to an administrative concept – a country, a province, a district, a locality.

There has been increasing interest in geospatial data in recent years, i.e. microdata linked precisely to a specific geographic location. This has the potential to reveal relationships and phenomena which are difficult to discover by analysing statistical databases alone. In official statistics, geo-referenced data has been collected in

population and housing censuses and household surveys, notably after introducing digital questionnaires on laptops, tablets, and cell phones. More recently, increasing use has been found for geospatial data in environment statistics and agricultural statistics. The interest in and use for geospatial data is clearly reflected in the sustainable development indicators. However, it should be born in mind that geo-referenced data is particularly taxing on data confidentiality.

2.12 Sustainable development indicators

In 2017, the UN General Assembly adopted the 2030 Agenda for Sustainable Development, including a global indicator framework for monitoring progress, informing policy, and ensuring all stakeholders' accountability. There are currently 231 unique indicators in the framework. The Inter-Agency Expert Group on SDG indicators has classified these into three classes as follows:



As discussed in the *Sustainable Development Goal Report 2020*, good progress has been made in recent years in increasing the availability of internationally comparable data for SDG monitoring. However, substantial data gaps still exist in terms of required geographic coverage, timeliness, and disaggregation level. Moreover, challenges remain

in compiling and disseminating metadata to document the data quality of SDG indicators at local and national levels.

The adoption of the SDG indicators in 2017 greatly increased the burden and the strain on NSOs and other producers of official statistics in the world in producing development data. Many of the SDG indicators were not compiled in large parts of the world. The figures quoted above show that the required data is not produced regularly for almost half the number of SDG indicators.

Thus, it is necessary to greatly increase the statistical activities and, what is more, to extend them into fields where there is little if any collection of statistical data. The nature of the SDGs has also called for data being collected in innovative ways. Substantial effort has been made on providing technical assistance in statistical methods, systems and applications in many countries in the developing world.

The effort to increase the collection of data and the compilation of SDG statistics should have been accompanied by increasing investment in statistical infrastructure and increasing government expenditure on statistics. This has not been realised. Nonetheless, some successes have been recorded, mainly based on various donor funded programmes. These have in particular focused on training on methods and statistical systems as well as direct technical assistance. Examples are the application of digital technology in various surveys, such as household surveys and farm surveys, and innovative methods in capturing data through aerial photography. Moreover, the years 2018 and 2019 saw some notable overall increases in SDG data collection in the developing world. In 2020, however, the COVID-19 pandemic severely halted the progress in the compilation of SDG indicators. Official statistics in developing countries were hit hard by the pandemic. Many statistical offices had to close down temporarily and work remotely on their tasks. In several countries, face-to-face collection of data had to be curtailed, resulting in surveys being much delayed or scrapped altogether. In some countries, statistical budgets were cut as a result of the pandemic. All of this has added to the difficulties of collecting the data necessary for the SDG indicators while at the same time showing up the great need for providing funds for statistical capacity building.

2.13 The statistical production processes

The process of producing official statistics can, in simple terms, be described as involving four logical steps – identifying user needs, collecting data, processing and

analysis of the statistics, and reporting and disseminating the findings. Traditionally, these processes have, as a rule, been undertaken within the different divisions or units of NSOs. Thus, as an example, the agricultural division of the NSO has taken care of all the individual steps of producing agricultural statistics. The division's statistical staff have designed the necessary surveys, collected the data, checked for errors, cleaned and edited the data, processed and tabulated, analysed the statistics, and reported on the findings. The price statistics have been compiled similarly within the department of price statistics, and the same goes for the various other statistics of the NSO.

This traditional system is referred to as a stovepipe or silo system. The reason for and the strength of this system is that it has ensured that there is systematic knowledge of the different subjects for which the statistics are to be compiled. The ensuing weakness of the system is that it does not focus on the statistical functions that are common to all statistical production processes and does not allow or encourage internal cooperation across the boundaries of different subject matter departments. Many NSOs have sought to alleviate these shortcomings by organizing centralised support for different subject matter departments in areas like questionnaire design, methodology, data collection, IT services, data editing and dissemination, all of which have helped increase the efficiency of the statistical production. However, this has been considered insufficient and efforts have been made to create a more functional system for the statistical production processes.

Significant support in these efforts was the creation of the Generic Statistical Business Process Model ([GSBPM](#)). This model has been developed under the coordination of the Statistical Division of the UNECE in Geneva, based on innovative practices in a few leading NSOs. The GSBPM seeks to describe and guide the overall process of the statistical production as well as the individual production processes. The idea behind the GSBPM is that the statistical production is better organized around functions than subject matters and that the same procedures can be utilised for the generation of several subject matter statistics. Thus, as an example, the same procedures for collecting data apply to several subject matter areas. Also, instead of designing and building specific methods and IT tools for each subject matter area, the idea is to build methods and tools for the different functions that can be utilised in many subject matter areas.

It is useful to describe the overall statistical production process in terms of the GSBPM. The model identifies and describes eight phases of the overall statistical production

process (specify needs, design, build, collect, process, analyse, disseminate, and evaluate), divided into sub-processes; 44 sub-process in all.



The production process starts by identifying the needs of the particular statistics that are being considered. Here, the recommended procedures apply equally to all types of statistics; it is necessary to determine what statistics are needed, who needs them and for what purposes, if there are similar statistics available, and what are the pros and cons, gains and costs of producing new statistics. This phase ends with deciding whether to proceed and plan for a new or modified statistical product and, if so, what this product should look like.

The second phase (design) involves determining how the new product should be produced and designing the methods and procedures for creating it.

The third phase (build) involves building the tools for producing new or amended products. Both this and the design phase make heavy demand for the IT and methodological services of the NSO. Here, the basic assumption is that the same methods and IT applications can be used in the production of several different products. This requires that the software and applications be designed and built as modules that can be used in many production streams and interchanged. This is one of the keys to enhancing the efficiency of the production processes.

The fourth phase (collect) involves collecting data needed for the new or amended statistical product. The data collection procedures are based on outputs of the previous phases. The collection methods have been determined and designed so all that is needed is to organize, prepare, and implement the data collection. This phase includes hiring or selecting and training staff involved in data capture, both in surveys and in other data collection modes. It also includes a possible trial run of the data collection, usually referred to as conducting a pilot survey or data collection.

The fifth phase (process) involves checking and editing the collected data and preparing it for analysis, as well as carrying out the necessary tabulation.

The sixth phase (analyse) involves analysing the new statistics, laying the foundation for analytic reports of the new or amended statistics.

The seventh phase (disseminate) involves writing and editing the analytic reports, preparing press releases based on the new statistics, including producing such graphs and other visual means that may enhance the message brought out by the new statistics. This phase involves the actual release of the statistics and subsequent press releases and reports in accordance with the release calendar of the NSO, editing of the website on which the statistical products are posted, and communicating with users, seeking and capturing their feedback.

The eighth phase (evaluate) involves evaluating the new product and the production processes that were applied. This evaluation is carried out for each sub-process applied in the production of the new or amended statistics. The basic idea is to assess the quality and efficiency of each step of production as well as the overall quality of the end product.

The evaluation of a product and the process by which it was produced requires that all decisions and actions taken in each sub-process of each phase be thoroughly documented in such a way that the documentation at each stage forms the basis and is used for subsequent stages. This documentation is referred to as **process or structural metadata**.

The GSBPM is said to have several over-arching processes, i.e. processes that apply to the whole production process. One of these is metadata management and involves both the creation of metadata at each stage and its transfer and utilisation at subsequent stages of the overall production process. Metadata may be grouped into two types, process metadata and product metadata. The process metadata informs in detail on the methods and procedures applied in the statistical production, as described above. The process metadata is for specialised use in the statistical processes and for use by experts for enabling them to evaluate in detail the quality and the robustness of the statistics. The product metadata is compiled to inform the users about the specifications of the statistics, their strengths, weaknesses, applicability, comparability, and delimitations. Most NSOs strive to compile product metadata, at least that pertaining to the statistics most used, and publish on the web.

Another main over-arching process concerns quality management. To improve quality, quality management should be present throughout the business process model, based on the evaluation and quality control at each stage, each sub-process. If done in accordance with the suggestions of the GSBPM, quality failures can be detected and analysed at every stage of the process, traced to failures at previous stages, corrected or amended, thus raising the quality of each sub-process and the final product.

The awareness and use of the GSBPM have grown substantially in the last few years. The main importance can be the impact it has had on replacing the traditional stovepipe thinking and subject-oriented approach to producing statistics and encouraging planning based on functions that are common to all statistical production. In this way, the GSBPM has increased communication across subject matter boundaries as well as cooperation between methodologists and subject matter experts. It has encouraged IT experts to design their applications as interchangeable modules between production processes and can be reused in several processes and for several products. The GSBPM has also led to increased focus on documentation of the production processes of different products, thereby greatly facilitating amendments of processes and products leading to increased quality of the statistics.

2.14 Managing quality

In the last few decades, NSOs and other producers of official statistics have spent much effort on improving the quality of their output and adopting quality management principles and procedures for that purpose. This has partly been driven by the interest of international and supra-national organizations in enhancing the relevance, consistency and comparability of the official statistics of their member countries. Quality management efforts have been comprehensive but multi-faceted and dependent on the focus of the different organizations. The main message that has been brought forward and adopted by many NSSs is the insistence on the need to observe the quality of official statistics, at all stages in the production process as well as the end product. This has been universally accepted, and NSOs have responded by adopting quality principles for their statistics and statistical processes, organizing and implementing quality management and control, and applying quality assurance systems as benchmarks for their statistical production and outputs.

NSOs and other producers of official statistics turn out numerous statistical products every year. These products are required to fulfil several criteria as regards their relevance, impartiality, accuracy, and timeliness. These criteria are derived from the UNFPOS, codes of practice based on the UNFPOS, specific international standards as well as statistical laws of the different countries.

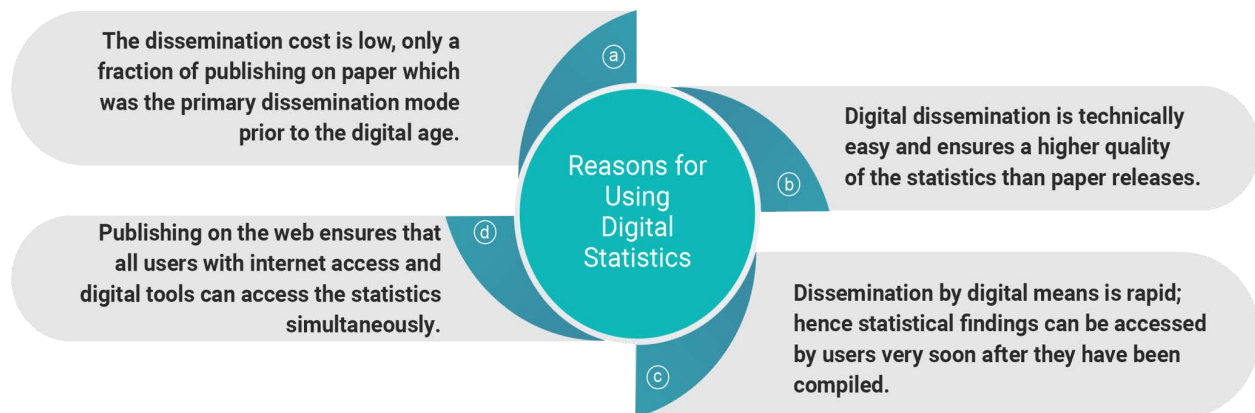
At the global level, the *UN National Quality Assurance Framework for Official Statistics (NQAF)* was first adopted by the UNSC in 2012. The NQAF was subsequently revised by the UNSC with the issue of the [NQAF Manual](#) in 2019. The Manual includes recommendations, framework and implementation guidance and is directed at assuring the quality of official statistics throughout the entire NSS of a country. The Manual offers comprehensive guidance for an NSO on adopting and operating a quality assurance framework to help implement quality management policy.

In the European Statistical System (ESS) various measures have been taken that oblige the NSOs and other producers of official statistics to observe quality and operate quality management and control. Thus, the ESS has included provisions on quality in its statistical legislation, issued a quality declaration and a Code of Practice, and adopted a Quality Assurance Framework of the European Statistical System ([ESS QAF](#)). Furthermore, an *ESS Handbook for Quality and Metadata Reports* has been issued (latest version 2020) along with various guidelines on managing and improving quality.

In the field of economic and finance statistics, the International Monetary Fund (IMF) has sought to ensure the quality of the statistics of member states by implementing the data dissemination standards, developing a *Data Quality Assessment Framework* ([DQAF](#)) facilitating a comprehensive view of data quality, and undertaking regular reviews of the quality of the statistics of the different countries (named reports on the observance of standards and codes, ROSC).

2.15 Disseminating and communicating the statistics

In the last few decades, the digital revolution has allowed NSOs and other producers of official statistics to transform their dissemination of official statistics. Nowadays, most NSOs release their statistics by digital means, in particular on their websites. There are several reasons for this:



Official statistics are mostly released in the form of tables or through access to databases. Many NSOs provide interactive databases on the web that allow users to specify their own tables. NSOs and other producers publish their releases of new statistical findings on their websites as well as their larger and more detailed reports of statistics on various subject matters. They also use the websites for publishing reports on statistical production processes and products, such as reports on content, quality and applicability of the different statistics, as well as their statistical policies, rules of procedure and other documents describing the basis for the statistical activities and processes. This has the added advantage of allowing easy and quick updating of documents.

Many NSOs use their websites or data portals as the main release mode and only print tables, reports, and other releases on special demand. NSOs and other producers in countries with low digitisation rates and undeveloped digital networks continue to provide printed publications, seeking to ensure that the statistics are accessible to most

segments of the population. Some NSOs are increasingly using social media to disseminate “headline” figures, with links to their websites for more detailed information.

In the international arena, several rules and guidelines on disseminating official statistics have been advanced, based on the UNFPOS (see here UNSD guidelines for improving data dissemination in the digital age). These aim to encourage producers of official statistics to fulfil specific minimum criteria regarding the public release of their statistics, the quality of the release, regularity, and periodicity, and the access by users of the statistics.

The IMF has issued three dissemination standards to which the member countries subscribe. They describe specific requirements that the countries commit themselves to fulfil. These concern the coverage of the statistics produced and periodicity of their provision, requirements that statistics are published at pre-determined times according to a statistical release calendar, and requirements for metadata, i.e. information about the methods and classifications followed in the statistical production. Release calendars should be published in advance so that all users of statistics are given equal opportunity to receive statistical information and access the statistics simultaneously.

The three IMF dissemination standards ([↔](#)) vary in their number and severity of requirements. The lightest is the General Data Dissemination System (GDDS) which many developing countries subscribe to (the latest version is the enhanced GDDS (e-GDDS)). The Special Data Dissemination Standard (SDDS) makes considerably heavier statistical provision requirements than the GDDS while the so-called SDDS+ contains additional requirements for the provision of monetary and finance statistics. Member countries with more advanced statistical systems subscribe either to the SDDS or the SDDS+.

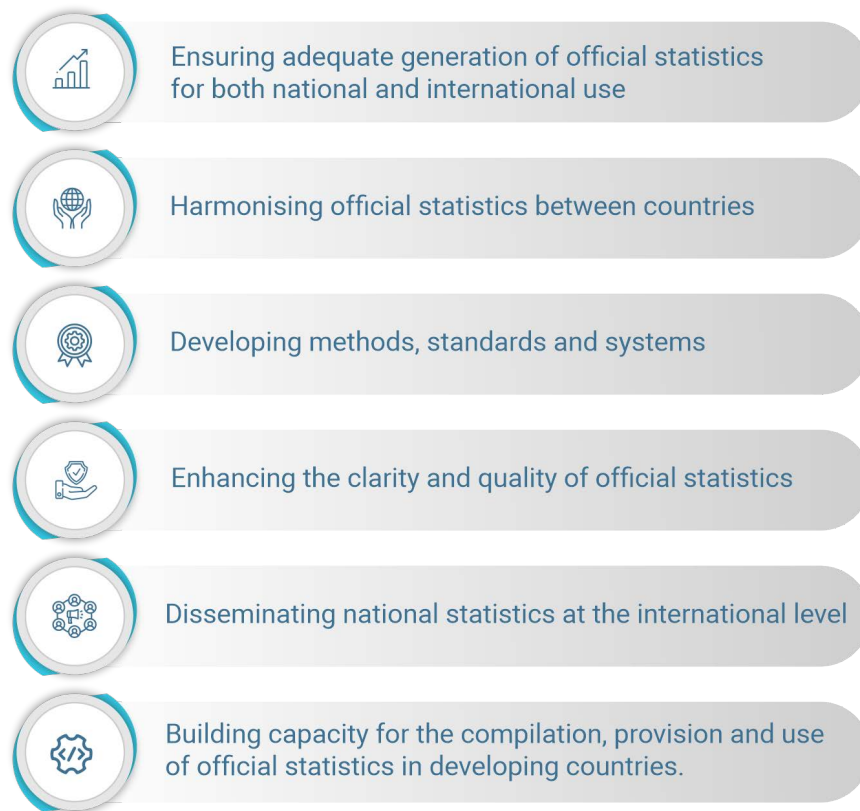
The *European Statistics Code of Practice* ([ESS CoP](#)) contains, among other things, specific principles and guidance relevant to the dissemination of the statistics. The ESS CoP lays down specific requirements for clarifying the statistical outputs, their regularity, timeliness, and how they are released. All NSOs and other producers of official statistics within the European Statistical System follow and respect these requirements.

Recommended international practice reinforced by ESS CoP and dissemination standards discussed above, require NSOs and other producers of official statistics to publish metadata on their statistics along with the statistics themselves. Most NSOs strive to compile product metadata, at least that pertaining to the statistics most used, and publish them on the web.

NSOs publish their statistics in aggregate form, thereby seeking to ensure the confidentiality of the data providers and the subjects they refer to. There is, however, substantial demand for microdata for research purposes. Several NSOs have in recent years started to release or grant access to microdata to researchers. For some years, some NSOs have been preparing a specific set of microdata for research, initially to be handed over to recognised researchers, more recently for release on the web. The data set has then been prepared specifically for such use by anonymisation, i.e., removing identifiers of individuals, households, and businesses, and removing variables that would have allowed indirect identification. Some NSOs have also granted on-line access to such microdata for research. Granting access to microdata is usually also accompanied by documentation signed by the researcher specifying the datasets that are made available, the purpose of use of the data, the safeguarding of the data as well as a pledge to respect rules of statistical confidentiality and the privacy of respondents. Granting access to microdata for research purposes entails a significant addition to the utilisation of the data and the value of the statistical production.

2.16 International statistical cooperation

As outlined at the beginning of this chapter, international cooperation in official statistics is both long-standing and extensive. It reaches all countries and all NSOs of the world and encompasses all aspects of official statistics. The international statistical cooperation has several objectives, of which the main can be said to be the following:



Following its foundation in 1946, the United Nations Statistical Commission (UNSC) has been the centre of the world-wide cooperation in official statistics. The UNSC is the forum for discussions and decisions on statistical development and harmonisation, for development of standards, classifications, concepts, methods and procedures as well as on policies and actions to extend the cooperation and statistical development to all continents and countries. The work on these actions is carried out, both on the global and regional level, in the various institutions of the UN, including the International Monetary Fund and the World Bank (the so-called Bretton Woods institutions), as well as in various other international and supranational agencies.

The UN Statistics Division (UNSD) is the secretariat of the UNSC and coordinates many statistical cooperation aspects. It also receives statistics from member countries and makes these available in databases that can be accessed online and in various publications. The regional dimension of the statistical cooperation is the responsibility of the five UN regional commissions in charge of statistical development and capacity building in their respective regions.

Various specific institutions of the UN also work at the global level on statistics in their respective domains. A few of these can be mentioned. The World Health Organization

(WHO) is concerned with harmonising and developing health statistics as well as collecting health statistics from member countries. The International Labour Office (ILO) harmonises and develops standards for labour statistics. The Food and Agriculture Organization of the UN is concerned with statistics on agriculture, forestry and fishing, and on production and supply of food in the world. It also engages in statistical capacity building in developing countries. The United Nations Educational, Scientific and Cultural Organization (UNESCO) is concerned with statistics in its field, developing standards and collecting statistics from member countries. The United Nations Children's Fund (UNICEF) is engaged in developing statistics relating to children and families and conducting statistical programmes in developing countries. The United Nations Population Fund (UNFPA) works with population statistics and census taking, largely focusing on developing countries. The United Nations Conference on Trade and Development (UNCTAD) compiles, processes and validates a wide range of international trade statistics. Other UN institutions such as the United Nations Development Programme (UNDP) and the United Nations Industrial Development Organization (UNIDO) engage in statistical capacity building programmes in developing countries.

The International Monetary Fund (IMF) and the World Bank, the Bretton Woods institutions, are major international statistical cooperation partners. The IMF focuses on economic, financial and monetary statistics, and it develops standards and handbooks on these subjects. It sets the dissemination standards mentioned previously on minimum requirements for compilation and regular provision of statistics in its field. The World Bank is a major actor in statistical capacity building, developing, funding and promoting capacity building programmes in developing countries.

Various international organizations outside the UN system are involved in statistical cooperation and development at global, regional and sub-regional levels. In particular, mention can be made of Eurostat, the statistical office of the European Union (EU). The NSOs and other producers of official statistics in the 27 EU member states, together with the four member countries of the European Free Trade Association (EFTA), form the European Statistical System (ESS). Under Eurostat's leadership, the ESS countries have harmonised the bulk of their official statistics, including standards, procedures, and the requirements made for statistical quality. Eurostat is among the leaders in international statistical cooperation, participating actively in developing standards and procedures.

The Organization for Economic Cooperation and Development (OECD) is an association of several developed countries in Europe, America, Asia and Oceania. For a long time, the OECD has been engaged in developing and harmonising statistics, mainly economic

statistics, in its member countries and has been at the forefront in international statistical cooperation.

The Partnership in Statistics for Development in the 21st Century (PARIS21) is an important player in statistical capacity building in developing countries. It aims to increase the use of statistics for decision-making, strengthening statistical systems, for instance, by promoting and facilitating the work on NSDSs and providing a forum for donor cooperation in the field of official statistics. Regional development banks also play a critical role by providing technical assistance to their member countries for statistical capacity development.

Another example of regional statistical cooperation is the Economic and Statistical Observatory of Sub-Saharan Africa (AFRISTAT), with its 22 member and created in 1993. AFRISTAT is an intergovernmental organization whose sole working objective is the development of statistics. It devotes most of its resources to strengthening the statistical capacities of its member States and those of the sub-regional economic integration institutions. AFRISTAT, based in Bamako, Mali, contributes to the development and harmonisation of economic, social and environmental statistics in the Member States and strengthen their skills in these areas.

Most of the international organization mentioned above participate actively in developing statistical methodologies and guidelines and extending data collection to new domains required by world agendas. Many of them contribute actively to statistical capacity building in developing countries, through technical advice and/or financing of programmes. Some of them also undertake assessments of national statistical systems and statistical programmes, e.g. through so-called assessments, peer reviews or reports of specific statistical operations aspects. All the institutions participate in the current statistical work relating to the 2030 Agenda for Sustainable Development. The work on the SDG indicators involves the international statistical players in one way or another – in developing new techniques, in educating and training staff to compile statistics in line with modern and harmonised concepts, standards, and methods or providing technical assistance and funding for such statistical work.

2.17 The constant challenge of modernizing official statistics

During the last few decades, the operations and products of NSOs and other producers of official statistics have undergone extensive modernisation in many fields. This has been possible by the recent and steadily technical developments and the simultaneous fall in relative prices of digital hardware and software. During this time, the demands made on official statistics have changed markedly. These have not only been for more significant provision of statistics in traditional fields but also for statistics on new and emerging subjects. There has also been growing demand for higher periodicity in statistical production, better regional coverage and small area statistics, easier and quicker access to the statistics as well as greater accuracy, granularity and quality. This development can only continue; it has already had a significant impact in the developed countries of the world but needs to be strengthened and secured in the developing parts of the world.

The digital age has dramatically impacted the NSOs, bringing considerable changes in their activities, leading to large gains in output, coverage, and quality of the statistics. The degree of efficiency has significantly increased. The NSOs and other producers of official statistics offices have offered much-improved services to their users regarding availability and coverage of the statistics, periodicity, ease of access, quality, disaggregation and relevance. Data collection has been transformed, as discussed above, with traditional paper questionnaires being replaced by electronic questionnaires via the Internet or uploaded on tablets, laptops, and mobile phones and transferred over a digital network to the central databases of the institutions. Many NSOs have also started to collect data from businesses through web-portals, in some cases with the businesses linking their information systems to the portals. Progress has also been made using aerial photography to gather data and information. This is thought to add new potential to acquiring information in several fields, not least for agricultural and environment statistics. This is mainly thought to bring increased data collection possibilities for the SDG indicators in these and other areas.

Among other advances that can be mentioned are new techniques for transferring data between computers, termed **machine to machine** transfer of data. Recent digital advances have also involved large increases in data storage and computing capacity. Significant advances have also been made in statistical software, transforming manual handling of data by digital handling, facilitating many tasks and processes, and increasing speed and quality of processes through automation. Data security and

confidentiality have also been enhanced by recourse to digital means in data collection, data processing and data exchange.

NSOs and other statistical organizations have been undergoing transformation to increase efficiency, relevance, and quality. The restructuring of the statistical business process in accordance with the GSBPM results in greater efficiency and higher quality in all the production processes and the overall operations of NSOs. Critical factors in this respect are planning for reusing digital applications and specific functions between different subjects and departments and breaking down the stove-pipe structure barriers. Discussions are also ongoing in international fora on structural and organizational issues of NSOs, involving enhanced use of digital technology.

2.18 Impact of the COVID-19 pandemic

The COVID-19 pandemic in 2020 has had disruptive effects on the production of official statistics worldwide. The disruptions resulted mainly from the need to diminish physical communication and exercise distancing between people to prevent the spreading of the virus. This impacted data collection in many countries that collect their data mainly by visits to households and businesses as surveys had to be cancelled and data collection in the field by enumerators had to be stopped to reduce the risk of contamination. On the other hand, for NSOs and other statistical producers with broad access to administrative data, the effect of the COVID-19 pandemic has not been that dramatic on data collection. This shows up one main strength of utilising administrative sources or other innovative data sources for official statistics and underscores the importance of developing administrative records and registers to enable and facilitate their use for statistical purposes.

Apart from the disruptive effects on data collection, the pandemic has hurt the statistical production in many countries, particularly by severing the continuity and regularity of the statistical activities and outputs.

In the NSOs and the other producers of statistics, regular activities were disturbed as staff had to be sent home to carry out their duties by virtual means. This has most likely not had significant effects in well-developed countries with excellent network coverage and ample computer capacity. The effects were strongly felt in NSOs in developing countries with little to spare laptops, limited network connection, and uneven electricity provision. In several countries, statistical budgets were cut due to the pandemic and face-to-face collection of data had to be curtailed, resulting in surveys being much

delayed or scrapped altogether. All of this has added to the difficulties of collecting and processing the necessary data to inform COVID-19 response and in the longer-term for the monitoring of the SDG indicators but eventually showing up the great need for providing funds for securing resilient statistical capacity and infrastructure.

2.19 Infrastructure and resources

Operating an NSO or a similar unit of production of official statistics requires building space, equipment as well as human and financial resources. An NSO does not need a very specialised space and infrastructure other than computer equipment. The basic needs are for office space and meeting rooms with the usual inventory of desks, chairs and the like as well as space outside the proper offices for a reception area and library with a study area for visitors, such as journalists, researchers and students. The NSO will also need facilities for storing its archives safely as well as space for servers of appropriate quality and security, fire-proof if possible.

The NSO has quite extensive requirements for computer equipment. An NSO cannot function without modern computer equipment, such as servers, networks workstations, laptops and/or tablets as well as printers. A minimum requirement for workstations is one per staff member. Laptops may be needed to work remotely, and tablets, and mobile phones for both communication and data collection. All equipment must be connected to a local area network requiring both wired connections and appropriate software. But the NSO does not thrive on hardware alone. It requires various software tools such as operating systems, basic office ware, database software, software for communicating, including running the website of the NSO, and a host of applications for the various production processes. The software should also include virus protection. For security reasons, the NSO also needs to apply standard protocols for data exchange, both within the NSS and for outside delivery and reception of data.

All computer equipment (hardware), and software alike, must be regularly updated. It is recommended that the NSO formulates and implements a medium-term IT strategy, perhaps of some 4-5 years, including plans for updating the hardware and software in specific instalments. This is recommended with a view of spreading the cost of renewal and updating as well as evening out the burden of maintaining the equipment. Care should be taken that upgrading benefit all employees using computer equipment. A few years ago, many NSOs preferred to use software and systems specialised for their particular use. The conditions for acquiring software and systems, however, have changed markedly in the last few years. Many systems and software can now be bought

off-the-shelf at a much lower cost than having them tailor-made, and much of the available software is now open-source, generally free of charge and free to use and adapt to the needs of users. Using open-source and off-the-shelf software usually saves much money and greatly adds to the flexibility of IT operations. Computing and storage “in the cloud” have also involved dramatic additions to capacity and removed IT operations constraints.

NSOs and the other producers of official statistics are very specialised agencies. To operate a modern NSO and satisfy domestic and international requirements for compiling and communicating statistics, the office needs staff with mixed but relatively high professional skills and expertise. The mixed skills include very specialised staff such as methodologists, IT specialists and highly trained statisticians, subject matter experts as well as assistant staff, administrators etc.

Many NSOs require field workers for data collection. All staff should receive training regularly. It is recommended that the NSO runs a continuous multi-annual training programme spelling out how the office intends to satisfy the training needs and training interests of staff. New staff members should receive introductory training about the nature and requirements of official statistics, the rules for confidentiality, the office's operations, etc. It is further recommended that the training organized by the NSO be offered to other producers of official statistics and staff in regional offices. Allowing staff members to enhance their soft and hard skills such as working methods, computer skills, languages, and project positively impact staff satisfaction and motivation.

It goes without saying that NSOs and other producers of official statistics need financial resources to finance their operations. Salary and wage cost are usually by far the largest cost components. In most countries, the NSOs and other producers are financed through the central government budget. In some countries, the annual budget allocation is basically for use by the NSO within the normal confines of its original budget proposal or budget request. This is the recommended mode of financing official statistical activities. In some countries, although the budget of the NSO is set out specifically in the government budget and approved as such, the budget allocation to official statistics is still subject to particular scrutiny and approval by the relevant ministry, often the Ministry of Finance. This implies that the NSO cannot be sure that it will receive all the funds approved on the budget, receive it regularly or evenly over the fiscal year. This practice is considered much inferior as it involves great uncertainty about the operations of the

NSO, the conduct of its survey programme, and prevents all flexibility in the operations and spending.

It is a sad thing to relate that most NSOs in the world are underfunded. The same applies to other producers of official statistics in MDAs. NSOs and official statistics are not very popular phenomena; they are not held in high esteem, are considered un-sexy, to use the popular speech. In many countries, wage and salary levels in NSOs are lower than in other government agencies, in some countries much lower.

This has severe implications for official statistics as it gets challenging to hire skilled staff, difficult to retain good employees as they will seek higher-paid jobs elsewhere, both within and outside the public sector. Unfortunately, despite their obligations – internally to ensure that reliable and regular official statistics are produced and externally to ensure that the provision of official statistics meets the country's international commitments – governments in many countries fail to provide adequate funding to official statistics. In the developing world, many NSOs rely on donor funding for essential parts of their operations. This is not a sustainable situation as it entails that the NSO does not have full control of its operations and cannot formulate and implement its statistical programme in accordance with national priorities.

It seems clear that the technical transformation and modernisation of statistical activities will continue unabated in developed countries. This will not happen in developing countries at present funding levels. The main tasks ahead in this respect are bringing the technical and organizational advances to the developing world. Without substantial digital and infrastructural advances in the developing part of the world, their official statistics will remain poorer and not sufficient for constituting the basis for economic, social, and environmental planning and advancements.