Code for Information Quality 2020

Colophon

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Foreword

Information quality is becoming increasingly important for the services that organisations provide to their customers, for cooperation between organisations and for compliance with legislation and regulations. The Code for Information Quality is a tool that managers can use to organise and control the quality of information. ‘Code' refers essentially to an 'agreement' and 'standard' that enables and facilitates coordination between organisations that exchange information. In our networked society, we believe that it is essential that we understand each other so that we can quickly come to an agreement. On the basis of a shared framework, it is also easier for suppliers, processors and consumers of information to share 'best practices'. The Code can be characterised as a set of guidelines and can serve as a standards framework for audits.

DAMA NL
1 June 2016

1. Introduction

1.1 Importance of the Code

Information makes the difference in almost every organization in every industry. Products and services are becoming information-intensive:

- an online shop can only survive if that company knows who its (potential) customers are, but also the weight and dimensions of its products so that efficient shipping can be chosen.
- a bank can only offer a mortgage at a competitive price if it has up-to-date information about the risk of non-payment and the value of the collateral.
- the government can only expect compliance if it knows the citizens and businesses and provides tailor-made services - for example, by pre-completing the tax return;
- but compliance also requires information showing which citizens and companies should be held accountable for their behaviour (e.g. when making declarations).

Accountability goes further and further - that is the consequence of a complex and risk-averse society:

- about food, we want to know exactly where it comes from and what ingredients it contains;
- a bank must be able to demonstrate in detail that it holds sufficient reserves;
- the government must be able to explain every decision in a reasoned way - it must be able to do so at any time and not only when a decision is challenged in the media.

This is only possible with complete, correct and up-to-date information.

Management controls must be applied earlier and be more precise. Whoever has the best information position and forecasting models is best placed to do so and is least likely to make the wrong choices and be overtaken by them. Management information today is crucial for organisations - statistical trends from internal and external sources, information on internal business operations and an overview of the moods and trends as indicated by social media. This applies both to the business community and to the government.

Information therefore determines the success of an organisation, and must be up-to-date, reliable and available at all times. More and more executives are realising this. They also understand that ad hoc quality improvement projects are not sufficent and that a structural approach and continuous attention to data quality by the board and management is required. The emergence of new functions - sometimes even a Chief Data Officer on the Board of Directors - shows that this awareness is actually beginning to penetrate.

1.2 Objective of the Code

The Code is a framework and set of guidelines intended to give managers control over the quality of the information that is delivered.
Insight into the quality of information is necessary to improve or maintain the services provided by businesses to customers and by governments to citizens and businesses ('information consumers'), to meet the wishes of a high-quality society and to ensure compliance with laws and regulations by the information processor.

The primary objective of the Code is to gain insight into the quality of the information and to promote its quality. The quality of the information in turn depends on the quality of a number of other elements ('objects') such as input, the information processing process and agreements with information consumers and suppliers. The quality of the information is yet another means of achieving higher objectives, such as interoperability of information processors, information consumer satisfaction and the organisation's image. See figure 1.

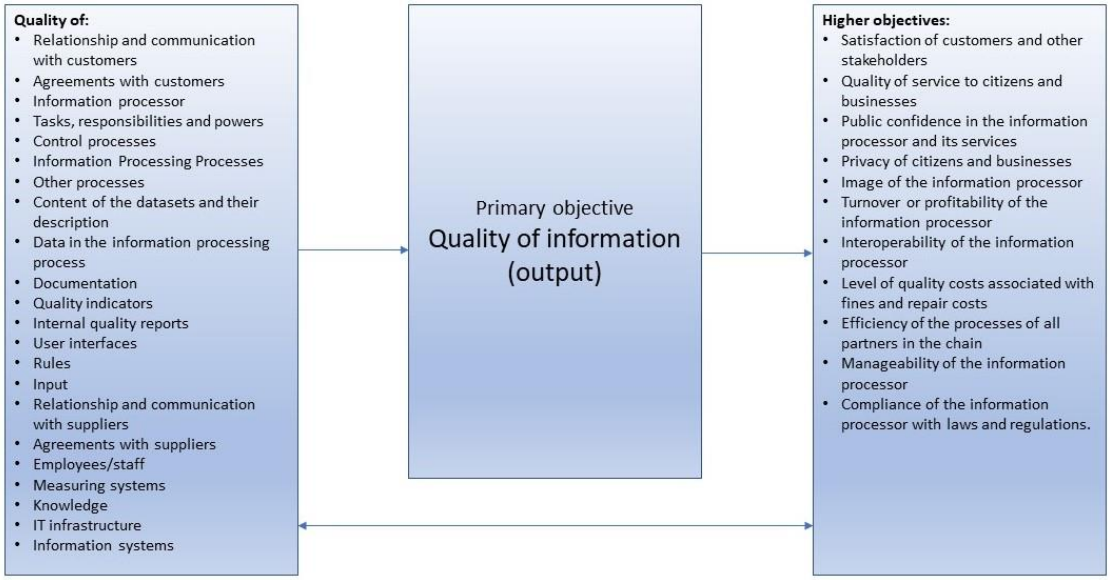

Figure 1 Primary objective of the Code, its dependence on the quality of other elements and its contribution to higher objectives (→contributes to; ←depends on).

Information can also be part of a product or service. For example, the provision of a telephone subscription is accompanied by information about this service. This could include information in a quotation, information about the delivery of the subscription and information in the invoices. The Code is not about the quality of the product or service but about the information the information consumer receives about the product or service.

1.3 Target group of the Code

The Code is intended for all organisations that supply, process and purchase information, both in the profit and non-profit sectors. Information suppliers and information consumers can be both internal and external parties.

Information can be either the primary product or part of a product or service. Organisations that are part of a chain or network can play both the role of supplier and information consumer.

The Code is a tool for managers who are responsible for the quality of information that organisations collect, process, use and supply to information consumers. Process designers, professionals, quality managers, risk managers, auditors and advisors also belong to the target group of the Code.

1.4 Application of the Code

The Code can be applied in different ways:

1. As input for design or redesign processes. The Code specifies the requirements that must be met when a process goes into production and these can be taken into account in the design phase.
2. As a common framework for discussions between suppliers and information processors and between information processors and information consumers.
3. As a frame of reference for the compilation of a standards framework for auditors. Auditors' recommendations can be used to plan and implement improvement actions.
4. As an instrument for carrying out a self-assessment. The code is used as a checklist. The results of the self-assessment can be used to plan and implement improvement actions.
5. As a checklist for evaluating errors.
6. As a reference model for composing your own set of quality guidelines, baseline or quality management system.

The Code has been set up to support the determination of improvement actions and to bring risks to an acceptable level.

If desired, the Code can also be used for compliance audits. However, the Code does not yet have the status of a standard, accepted by a substantial group of users.

1.5 Background, ownership and management of the Code

The Platform for Information Quality in the Netherlands (NLIQ) has taken the initiative to set up the Code. NLIQ saw the Code as a shared product for managers who have an interest in the quality of information.

The first, 2015 version of the Code was compiled by an editorial board consisting of Rik Schut (Tax and Customs Administration), Peter van Nederpelt (Statistics Netherlands (CBS) and recorder), Thomas Wijsman and Henk Haxe (Tax and Customs Administration) and then assessed by a large number of experts in the field of information quality.

On 27 November 2015, the Code was transferred to Stichting Dama NL, because the NLIQ was dissolved. The Information Quality Working Group of DAMA NL has taken over editorship of the Code.

1.6 Release policy

The 2015 version of the Code was the first definitive version. For the time being, new versions are published annually on the basis of proposed amendments. These can be submitted by all users of the Code via info@dama-nl.org. No provisional versions will be published. An indication is provided of the changes that have taken place compared to the previous version.

1.7 Reading guide

Chapter 2 contains the basic assumptions made in the composition of the Code, the scope of the Code and the principles applied. The structure of the Code is also described in this chapter along with the characteristics of the guidelines.

Chapter 3 defines the concepts of quality and quality management. The objects whose quality must be managed according to the Code are also listed. This chapter also contains an overview of all the guidelines.

Chapter 4 lists existing national and international frameworks and the way in which the Code makes use of them. Attention is also paid to the conceptual framework of the Code.

Appendix 1 lists references used in the Code.

A list of terms (including definitions) is provided in Appendix 2. It is advisable to go through them in general terms first. Concepts and definitions have only been standardised to a limited extent in our field of activity, but they are necessary to understand the Code.

Appendix 3 defines the properties of data.

Appendix 4 contains an overview of the guidelines.

Appendix 5 forms the core of the Code and contains a complete specification of the guidelines. It presents the implementation of the framework in the form of objects that determine the quality of information. A chapter is devoted to a more detailed description of each object. For each object, one or more properties are identified. One or more guidelines are formulated for each property. Each guideline is explained, where necessary, and implemented by means of assessment criteria.

In the Code, the concept information comprises both data and metadata. When the term information is used, it is usually focussing on the data and less on the metadata.

2. Principles

2.1 Principles

The Code is based on a number of principles. These are explained in italics below with an example from the manufacturing industry.

1. **Output orientation**. The quality of the output for the information consumer is the primary objective. The Code is aimed at achieving the desired quality of the output.

   The quality of the beer is paramount.

2. The quality of the output depends on the quality of a number of 'objects' such as agreements with suppliers of information, employees, processes, information systems, knowledge and documentation. This is derived from the Object-oriented Quality and Risk Management model (Van Nederpelt, 2012). For the complete list of objects, see section 3.2.

   The quality of bottled beer depends on the quality of 'objects' such as the factory staff, the beer recipe, the brewing installation, the filling machine, the brewing and filling process, the information systems, the agreements with suppliers.

3. **Process orientation**. Information processing is a process. The framework for managing information quality is based on the approach used in the manufacturing industry. There are raw materials (inputs) that are transformed in a production process into an end product (output).

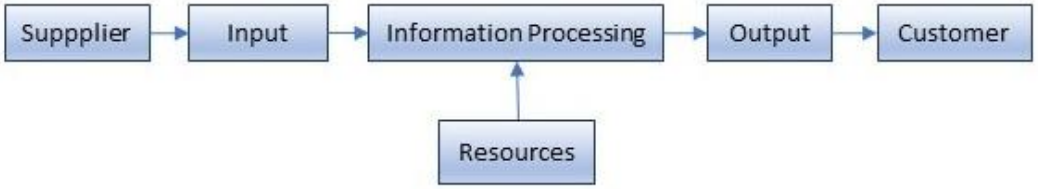

Figure 2 Process orientation and the main structure of the Code

A beer brewery uses raw materials (water, malt and yeast) and empty bottles as input. The process consists of brewing and filling the bottles. The output consists of bottles of beer.

In the case of information processing, information consumers can sometimes also play the role of information supplier. Think of a customer who provides information to a bank in order to get a mortgage and then receives information from the bank about this mortgage.

Furthermore, information can be processed both transactionally and batchwise. Finally, within the information processing process there may be databases ('information reserves' of master data) that are kept constantly up-to-date, such as customer databases, product catalogues and the government's basic register systems.

Note: A special feature of data processing is that both input and output are information. In the information processing process, however, this information has been transformed, merged, corrected and/or put on another medium.

Furthermore, information is reproducible at all stages of the processing process and is not consumed as in the case of physical raw materials.

4. **Risk orientation**. Problems with the quality of objects such as agreements, process and input pose a risk to the quality of the information product for the information consumer. Problems with the quality of the information product for the information consumer are in turn a risk for higher objectives of the information processor such as information consumer satisfaction. See figure 1 (paragraph 1.2) in which these dependencies are indicated.

   Problems with the quality of the objects mentioned above (factory employee, beer recipe, etc.) or the quality of the product can jeopardise objectives such as public confidence in the brewery's product, market share and the brewery's profitability.

5. **PDCA cycle or feedback loop.** The Code mainly plays a role in the Check phase of the Plan Do Check Act (PDCA) cycle. The Code can be used to check whether the quality of the objects in the Code still complies with the guidelines. The user of the Code can then plan and execute the improvement actions (Act).

   It is important to always check whether, for example, the quality of the empty bottles still meets the agreements. Otherwise, actions such as consultation with the supplier or, in the worst case, switching to another supplier should be taken.

2.2 Scope

The scope of the Code is the processing of structured information. In this context, processing is understood to mean: all operations that can be performed on information, such as compiling, storing, delivering and retrieving. See the glossary in Appendix 2.

Outside the scope of the Code:

- Documents that may or may not contain data such as advertising, quotations, contracts, invoices, administrative decisions and assessments. Only the structured part of the information in these documents, such as name and address details, fall within the scope of the Code.
- The quality of services and products, even if they are accompanied by the provision of information to the information consumers of these services and products. Services and products have their own specific quality characteristics such as the freshness of milk, the data limit of a GSM subscription and mortgage repayment conditions.
- The design process by which information processing processes and systems are set up. The Code focuses on the requirements set for the production line but not on the design, construction and testing of that production line (e.g. adequate project management or good training of the constructors).
- Quality of legislation and regulations and other focus areas that are beyond the influence of the information processors. These are seen as a given, even though they can have a major impact on the quality of information.

In addition, the user of the Code determines which part of the process falls within the scope. For example, there may be processes with internal suppliers and/or internal purchasers of information. If desired, the process can also cross the boundaries of an organization and a chain of information processing processes can be considered.

2.3 Structure of the Code

This section explains the hierarchical structure of the Code. The Code has four levels:

1. Part
2. Object
3. Focus area (object and associated property)
4. Guideline

See figure 3 for an example.

	Part I: Information consumer
1	**Information consumer relations and communication**
1.1	**Effectiveness of the relationship and communication with information consumers**
1.1.1	Communication with information consumers has been streamlined.

Figure 3 Example of the four levels in the Code

1. **Part**. A part is a logical collection of objects. Six parts are distinguished: supplier, input, information processing, output, information consumer and resources. See figure 2 in paragraph 2.1.

   For the brewery, the wholesale trade, retail trade and the on-trade are the information consumers. The output is crates and casks of beer. The process consists of brewing beer and filling bottles, crates and barrels. The input consists of raw materials for beer, bottles, crates and barrels. The raw materials come from different suppliers.

2. **Object**: On the second level, objects are named. An object is something that can be perceived or conceived. These are objects of which the quality must be guaranteed, for example the object 'agreement between an information supplier and an information processor'.

   The brewery, for example, has the object 'bottle of beer'.

3. **Property**. On the third level, properties of the object are named, for example the property *completeness of the* object *agreement*. The combination of a property and an object is also referred to in the Code as a focus area.

   The object 'bottle of beer' has the properties of durability and robustness.

4. **Guideline**. At the fourth level, the guidelines are formulated. A guideline describes the requirement or standard that applies to a property. The text of the Guideline is set out in a framework.

   Each guideline shall be explained where appropriate.

   In addition, a guideline is implemented in one or more assessment criteria.

   It also indicates the focus area for which a risk arises if the guideline is not complied with ('risk area').

Finally, where appropriate, reference material is mentioned in a guideline.

The guideline for the bottle of beer is that it can be kept for at least 12 months and that the filled bottle must be able to fall from a height of one metre onto a (non-brick) floor without breaking.

N.B. This structure was chosen because of the clarity of the Code. It also makes it easier to amend the Code and to assess the completeness of the Code.

2.4 Maturity levels

It can be said that the level of maturity of an organisation is higher as control measures are made more explicit and formalised. However, the Code does not apply maturity levels as in the Data Management Maturity Model (CMMI, 2014).

2.5 Characteristics of the Guidelines

This chapter discusses the different characteristics of the guidelines.

2.5.1 Qualitative guidelines

The guidelines in the Code are qualitative in nature. There are no limit values of quality indicators that have to be met. These can only be determined by the user of the Code.

2.5.2 Level of abstraction of the guidelines

The guidelines have been formulated as far as possible at the same level of abstraction. However, a difference in abstraction is inevitable and some guidelines will be more specific than others.

2.5.3 Weighting of guidelines

Not all guidelines have the same weight. In other words, the risk of achieving the required objectives in the event of non-compliance is not the same for every guideline. It may therefore be prudent to estimate the level of risk to the achievement of an objective if a guideline is not met. This mainly concerns the objective that the required quality of the output is not achieved or that information consumers are satisfied with the information provided.

3. Managing quality and risks

This chapter first defines the concept of quality and quality management. The objects whose quality must be managed according to the Code are then listed. Finally, attention is paid to risks and risk management.

3.1 Quality and quality management

Quality is the degree to which a set of properties and characteristics of an object complies with the requirements (ISO 9000, 2014). The Code focuses on the quality of object *information*. It is the information consumer who determines the requirements for the properties and characteristics of information.

An important property of information for the information consumer is its usefulness. In the Code, the usefulness of information is broken down into several aspects, such as the usefulness of the content of the dataset, the completeness of the records in the dataset and the correctness of the data in the dataset. See Appendix 5 Part II on output.

The quality of information also depends on the quality of other objects such as input, process and agreements with information consumers and suppliers. The Code therefore also formulates guidelines for the quality of these objects.

Quality management is defined in this Code as taking measures to ensure that the quality of output and the objects that contribute to the quality of the output meet the requirements set.

For the implementation of a quality management system, please refer to ISO 9001 (2014). It contains requirements that, according to ISO, a quality management system should comply with.

3.2 Objects whose quality needs to be managed

The Code distinguishes between the following objects. These are objects that determine the quality of information:

Information consumer

1. Information consumer relations and communication
2. Agreements with information consumers. Agreements can take various forms, such as contracts, covenants, protocols, cooperation agreements and data supply agreements. Sometimes agreements are even enshrined in legislation.

Output

The output of the information processing process consists of an information product.

3. Content of the dataset (output)
4. Dataset(output)
5. Records in a dataset (output)
6. Data in a dataset (output)
7. Delivery of the dataset (output)
8. Reports to information consumers

Information processing

9. Information processor
10. Tasks, responsibilities and authorisations
11. Management process
12. Information Processing process
13. Other processes
14. Description content datasets
15. Dataset in the process
16. Documentation
17. Quality indicators
18. Internal reports
19. User interface
20. Rules

Input

21. Content of the dataset (input)
22. Dataset (input)
23. Records in a dataset (input)
24. Data in a dataset (input)
25. Delivery of the dataset (input)
26. Supplier reports

Supplier

27. Relationship and communication with the information provider
28. Agreements with information suppliers
29. Measuring system

Resources

30. Employees/staff
31. Knowledge
32. IT infrastructure
33. Information systems

3.3 Guidelines

In the guidelines the properties and characteristics of all the above mentioned objects are discussed in more detail. Appendix 4 contains an overview of all guidelines. In Appendix 5 all guidelines are also explained and implemented by means of assessment criteria.

3.4 Risk Management

Risk is defined as the effect of uncertainty on the achievement of objectives (ISO 31000, 2009). The concept of objective is central to this definition.

The Code is mainly aimed at the objective that the quality of the information of the information processor (output) is of a sufficient level and therefore meets the set requirements (primary objective). This objective is in itself a means of achieving the objective of information consumer satisfaction (higher objective).

Other higher objectives on which the Code is focused relate to the following areas of attention:

- Quality of service to citizens and businesses ('information consumers')
- Public confidence in the information processor and its products
- Privacy of citizens and businesses.
- Image of the information processor.
- Turnover or profitability of the data processor.
- Interoperability of information processors
- Level of quality costs (in terms of fines, recovery)
- Efficiency of the processes of all partners in the chain: suppliers, information processors and information consumers
- Manageability of the information processor
- Compliance of the information processor with laws and regulations

See figure 1.

It is up to the user of this Code to formulate requirements for the above mentioned areas of interest and to make this SMART, so that these have the character of an objective.

The achievement of objectives in relation to the aforementioned areas of interest depends in part on the quality of the objects as they are referred to in the Code. In other words compliance with the Code's guidelines contributes to the achievement of the objectives.

Appendix 5, which contains detailed guidelines, always lists the most important objectives of the guidelines for each object.

If a guideline is not met, a point for improvement can be formulated. In order to prioritize the total of points for improvement, it is useful to estimate the level of risk in each case of non-compliance: what is the consequence of an object not being in order?

The risk level can be estimated with the formula:

Risk level = Probability x Impact

This concerns the probability that the impact will occur (in case of non-compliance) and the impact on the achievement of the objective.

Please refer to ISO 31000 (2009) for the setting up of processes for the implementation of risk management.

4. Existing frameworks

This chapter describes which frameworks already exist. A distinction is made between international frameworks, national frameworks and national frameworks for government. Finally, we will discuss the conceptual framework of the Code.

4.1 International frameworks

4.1.1 DMBOK

The Data Management Body of Knowledge (DMBOK) is a description of many topics that are relevant for information processing. Information processing is more than just ensuring data quality. In addition, the subjects presented by DMBOK are only partially interrelated (it is not an architecture), not standardised (it is not a guideline) and no specific instructions for use have been indicated (it is not a methodology).

DMBOK is a reference work in which valuable insights have been bundled in an area that is broader than the scope of the Code for Information Quality. DMBOK and Code are therefore two separate products that can complement each other well.

Data Management Association (DAMA) has published a guide on data management (DAMA, 2009). A second version of this guide was completed in 2017.

4.1.2 ISO 9001

ISO 9001 (2014) is aimed at achieving a systematic grip on quality in a demonstrable way. These standards describe the characteristics of a system that guarantees the quality of products/services (including 'information') and that this assurance is also made demonstrable. This traceability also implies attention to registrations and documentation.

Where the Code for Information Quality identifies the objects that determine the quality of an information product, ISO 9001 imposes requirements on elements of an operating system such as stakeholder analysis, risk analysis, quality policy, quality objectives (KPIs), assessment of suppliers, learning from deviations from specifications, internal audits, continuous improvement, periodic management attention for the entire management system ('management review').

ISO 9001 is also generic and applies to all types of organisations in all possible sectors. The Code only applies to information processing processes and is therefore specific in nature. In the Code, we refer to ISO 9001 as a standard for high quality control of the control processes.

4.1.3 ISO 8000

ISO 8000 is a collection of frameworks and guidelines, aimed at guaranteeing the quality of master data; initially in an industrial context, where data is not your product.

The standard, which is still under development, is based on the same framework as the Code for Information Quality ('data supply chain') and draws attention to the specification of (master) data and to the presence of the processes transformation, measuring and improving in relation to the roles of execution, design and management. According to ISO 8000, the most important quality criteria are: knowing origin, correctness and completeness.

The Code for Information Quality focuses more specifically on data quality and goes much deeper than ISO 8000. The terms defined by ISO 8000 are followed in the Code and the objects presented by ISO 8000 are explicitly made visible in the Code.

4.1.4 ISO 31000 and COSO ERM

ISO 31000 (2009) contains principles and guidelines for risk management and can be applied together with the Code. The Code indicates which objectives could be chosen for the risk that is to be managed.

COSO (2004) has developed frameworks for risk management at the level of the entire organisation (Enterprise Risk Management - ERM). This framework is a little further away from the Code because COSO advocates an integrated approach to risks at a central level and does not base itself on a set of self-selected objectives.

4.1.5 ITIL and Cobit

The Information Technology Infrastructure Library (ITIL) focuses on IT service management. ITIL contains a coherent set of best practices in the field of IT and is of British origin.

Cobit provides a framework that adds value through effective control and management of the organization's IT. Cobit includes ITIL and is of American origin. Cobit also has a set of standards for auditors.

Both frameworks can be applied in addition to the Code where IT is concerned.

4.1.6 Wang's Conceptual Framework

Wang (1996) carried out research into the quality aspects of data. The result of the research was a long list of 118 properties. From this list, a selection was made of 15 properties that were judged by users of data to be the most important. These properties were then divided into four categories (see Figure 4).

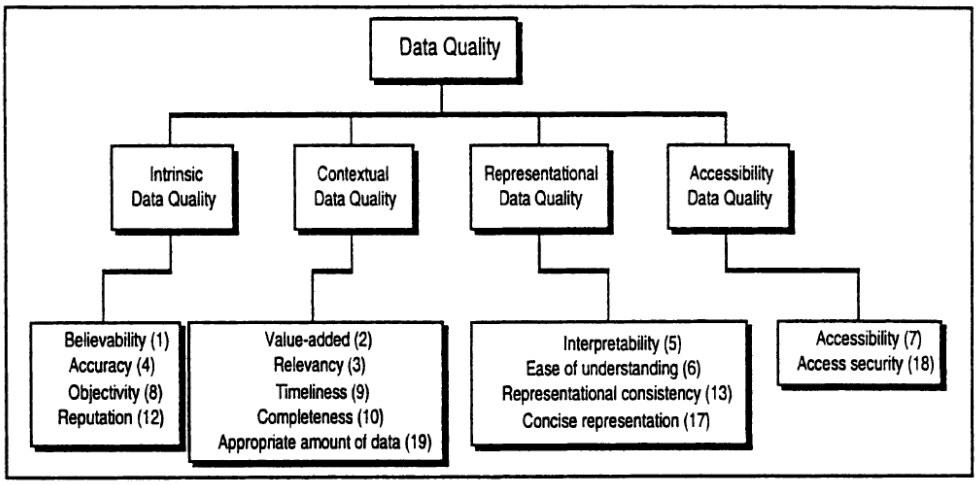

Figure 4 Conceptual framework for data quality

However, Wang has not defined the concepts in his conceptual framework. Also, he did not specify the object data further. The quality aspect 'Ease of understandig', for example, does not depend on the data but rather on the metadata.

4.2 Dutch frameworks for all organisations

4.2.1 General Data Protection Regulation (GDPR/AVG)

The GDPR imposes requirements on the processing of personal data. Among other things, the organisation must be transparent to the outside world as to which data are processed for which purpose.

4.2.2 Information security

The Code formulates a guideline for compliance with standards in the field of information security (see 33.1). ISO 27001 (2013) and ISO 27002 (2013) are obvious standards.

4.2.3 NEN 1888 and NEN 5825

These standards contain definitions, character sets and exchange formats for personal data and Dutch postal and electronic address data. The standard applies to any regulated form of information exchange, which requires the display of personal and address data in encrypted or unencrypted form.

This standard can be applied in the guideline on how to format the input and output data (6.6 and 24.6).

4.3 Dutch frameworks for the government

Frameworks that are specific to the government are listed below.

4.3.1 Dutch Government Reference Architecture (NORA)

The Dutch Government Reference Architecture (NORA, 2014) helps in the setup of services for citizens and businesses. This organisational architecture helps managers, project leaders and architects in their tactical and strategic management. By using the same principles and reusing solutions from NORA, organizations can better connect to each other and improve their services. NORA was adopted by the government in 2009 as the standard for the Dutch government and will be coordinated with users from all levels of government.

The Code can serve as a reference model for the baseline quality as it is called in NORA:

- AP33: The service complies with baseline quality.

The Code also refers to NORA where the guidelines and NORA overlap. This applies to the following principles:

- AP13: Source registrations are leading
- AP14: Report back to the source holder
- AP17: Information objects are systematically described.
- AP19: The service has been set up from the perspective of the information consumer.
- AP28: Service provider and information consumer have agreed on the provision of the service.
- AP31: The quality of service is managed on the basis of cyclical feedback.
- AP32 Quality of service management is anchored at the highest level of the organisation.

4.3.2 Baseline Information Security National Services (Rijksdienst)

The Baseline Information Security Agency (BIR, 2012) is an elaboration of both the Code for Information Security (ISO 27002, 2005) and the Regulations for Information Security (VIR, 2007). It contains requirements that are specific to the government. This standard can be applied in the guideline about information security (30.1).

4.3.3 Ordinance on Information Security for Special Information of the National Services (Rijksdienst)

The regulations (by the Rijksdienst) governing the information security for Special Information (VIRBI) lay down requirements for the protection of state secrets and departmentally confidential information. The Code does not address this requirement.

4.3.4 Basic register systems

For the government, the mandatory use of basic register systems (e-government) applies. Requirements are imposed on basic register systems (Lower House of Parliament (Tweede Kamer), 2003, requirement 4.3). One of the requirements is that there should be a strict quality assurance regime (see text box 'Requirements for basic register systems'). All requirements have been transposed into a guideline in the code.

Requirements for basic register systems
The official status of any source requires a very high standard of **accuracy, timeliness and completeness of the** data in a basic register system. This should guarantee that the quality of the data in the basic register system is better than any organisation can ever achieve on its own. The first of these is the **mandatory notification of cases of doubt by information consumers** to the holder of the basic register system and thus the creation of self-cleaning databases. Secondly, it is important that the quality of the data in the basic register system is **transparent** for all information consumers. This concerns the **transparency of all quality assurance procedures**, and the **quality level achieved** is also important: this avoids misinformation about the quality of the data.

4.3.5 Archives Act and Baseline Information System Central Government

The Archives Act (Archiefwet) (1995) states that public bodies are obliged to preserve the archival documents held by them in good, orderly and accessible condition, as well as to ensure the destruction of the relevant archival documents.

A government body must indicate on 'selection lists' which documents are eligible for destruction. These selection lists shall be drawn up by the Minister concerned.

In the Baseline Information Management Central Government (Baseline Informatiehuishouding Rijksoverheid) (ICTU) there is a government-wide framework of standards for sustainable, accessible and reliable government information. It contains minimum quality requirements, which primarily result from existing legislation and regulations supplemented with ingredients from other frameworks such as ISO/NEN standards.

A guideline has been formulated in the Code on the retention, archiving and destruction of datasets (12.1.3). This refers to the Archives Act and the Baseline.

4.4 Conceptual framework

A number of important terms used in the Code are defined in Appendix 2. Appendix 3 zooms in on properties of information. An example of the distinction made by the Code between data and information is given below.

Data
An example of data is shown in figure 5. Without further explanation (descriptive metadata) it is unclear what is meant by these symbols (numbers).

21 23 24 25 22

Figure 5 Data

Information
Information is said to exist when the meaning of the data is also known. An example of this is shown in figure 6. Although not everything is yet known, the data can still be interpreted and there is information involved.

Temperature in Amsterdam in degrees Celsius in week 32 of 2014

Monday	21
Tuesday	23
Wednesday	24
Thursday	25
Friday	22

Figure 6 Information

The additions "Temperature in Amsterdam in degrees Celsius in week 32 of 2014" in the header of the table and the days of the week in the rows of the table are descriptive metadata.

Information quality
Information has quality if it is useful, relevant and meaningful to the information consumer. The data must have a value in use. For example, the data in Figure 6 may be unusable or irrelevant if the information consumer is not interested in these data or if the permissible temperature is not known. In order to produce good quality information, it is necessary to know what the information consumer's requirements are and to comply with these requirements.

Appendix 1: References

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Appendix 2: Glossary and abbreviations

Term	Definition
Basic register system	One of the registries designated by the Dutch Government in which vital data about citizens, residents, companies, institutions, vehicles, topography, buildings and addresses can be centrally maintained.
Content of a dataset	The definition of the **dataset** expressed in as: • the type of **records** (entities, units) that make up the dataset, • the set of **records** contained in the dataset (population), • the **variables** included in the **dataset** and their meaning, • the period or point in time covered by the **dataset**, and • the classification systems used. Synonym: Concept of a dataset. Note: This is not just a question of the meaning of the variables.
Data	Objectively perceptible precipitation or recording of facts on a particular medium, in such a way that these data can be exchanged and kept for a longer period of time. Or: Symbolic representation of something that depends, in part, on its metadata for its meaning. Bron: ISO 8000-2:2012 (2012). Or: Re-interpretable presentation of information in a formalized manner suitable for communication, interpretation, or processing. BronSource: ISO/IEC 2382-1-1993 (1993). Synonym: Value of a variable, data(s).
Dataset	A collection of **records**. Or: Logically meaningful grouping of data. SourceBron: ISO 8000-2:2012 (2012). Synonyms: File, database, table, data collection. Note: A dataset can may also contain only one record. A database with several tables can also be considered as a dataset.

Term	Definition
Descriptive metadata	Description of the contents of a **dataset**. Or: Data that describes other data. BronSource: ISO 8000-2:2012 (2012). Synonym: conceptual metadata. Note: This is in contrast to process metadata, quality metadata, administrative metadata and metadata that indicate identifies the data.
Entity	**An object** in reality described by a **record**. Example: the income tax return of Mr. P. Jansen.
Entity Type	Type of **object** described in a **dataset**. Examples: income tax return, company, resident.
Focus area	Combination of an **object** and an associated property. Example: correctness of information.
Guideline	Instructions for the behaviour to be followed. Synonyms: Criterion, standard, requirement.
Information	**Data** with the corresponding **descriptive metadata**. Or: Knowledge concerning objects, such facts, events, things, processes, or ideas, including concepts, that within a certain context has a particular meaning. SourceBron: ISO/IEC 2382-1-1993 in: ISO 8000-2:2012.
Information consumer (or consumer)	Person, organization or organizational unit that receives and/or uses the information or data. Synonyms: User, citizen, company, taxpayers, payers of other contributions, recipient of a benefit or surchargesupplement, client.

Term	Definition
Information processor	Organisation that processes information from internal or external suppliers into information for internal or external **information consumers**.customers. Note: Information processor may also be considered to be a role of a supplier of a service or a product, as the provision of a service or a product is usually accompanied by an exchange of information. Synonym: Service provider (NORA).
Knowledge	The whole totality of meanings, concepts, skills and working methods that are considered to be correct and true and correct and that give directionguide to action (Weggeman, 2000).
Measuring system	A system that automatically gathers data from sensors or other devices.
NLIQ	Platform for Information Quality in the Netherlands (www.nliq.nl).
Object	Anything observable or conceivable (ISO 9000:2015 DIS). Synonyms: Component, entity, unit, instance/ occurrence appearance of an object type. When the word object is used, the more formal concept of **object type** is often referred tointended. Note: Objects can be both things in reality that are described in a **dataset** (persons, declarations, real estate) and things that occur in an organization (product, process, documentation).
Object type	Type of **object**. Example: The **object** Jan Jansen belongs to the **object type** Person.
OQRM	Object-oriented Quality and Risk Management (Van Nederpelt, 2012).
Processing of information	Any act or set of acts relating to **information**, including in any case the collection, recording, organisation, storage, updating, modification, retrieval, consultation, use, disclosure by means of transmission, distribution or any other form of making available, aggregation, linking, as well as the blocking, erasure or destruction of **information** (Wpb, 2000).

Term	Definition
Quality	Degree to which a set of properties and characteristics of an **object** meets requirements (ISO 9000:2015 DIS).
Quality management	Taking measures to ensure that the quality of outputs and the **objects** that contribute to their quality meet the requirements as set.
Record	**Data** relating to an object in reality. Synonyms: unit, tupel, row in a table, instance or occurrence of an entity (type) or object (type). For example: Data on company A, person B or policy C.
Resources	People/personnel, knowledge, IT infrastructure and information systems. Note: Datasets on the input side are not considered a resource. Resources are used but input is consumed.
Risk	Effect of uncertainty on the achievement of objectives (ISO 31000, 2009).
Supplier (of information)	Person, organisation or part of an organisation that provides information. Synonyms: Respondent, notifier, citizen, applicant, source holder (NORA). Note: A party may be both a supplier of information to and a consumer of information fromcustomer of an organization can be either a supplier of information or a customer of a product or service of the same organization.
Variable	Part of a **dataset** with a certain meaning. For example: The variable date of birth in a dataset of persons. Synonyms: Column in a table, field in a file, property, attribute, characteristicattribute. Note: A record consists of one or more variables.

Appendix 3: Properties of data

In this section, data properties are named and defined. These are the properties used in the guidelines.

The following subobjects are distinguished (Van Nederpelt, 2013):
- Variable of a dataset
- Records in a dataset
- Cell of a dataset
- Dataset
- Data in a dataset
- Delivery of a dataset
- Content of a dataset
- Description of the contents of a dataset

Completeness of the list of data properties has not been sought. Dozens of data properties are described in the literature (Wong & Strong, 1996; Bouwman, s.a.). A selection has been made of the most important properties.

The combination of data with one characteristic, for example 'correctness of the data', forms a focus area.

Focus area	**Definition**
Usability of the contents of a dataset	The extent to which the content of a dataset is relevant and complete. Note: If the content of a dataset is relevant/usable by the recipient, it meets the definition of information.
Usability of records in a dataset	The extent to which records in a dataset are relevant and complete. Example: A duplication is a form of irrelevant entity.
Consistency of data	The extent to which data from the same entity are the same or show credible differences. Note: There are different forms of consistency: • Consistency between provisional and final data • Consistency in time • Consistency between datasets Related: Data integrity.

Focus area	Definition
Data integrity	The extent to which data comply with certain rules. Note: For example, the age of a living person cannot be minus two (-2) years. Note: There are several forms of integrity: • Integrity of the data in the cells of a variable. • Integrity of data between cells within a record. • Data integrity between records (including referential integrity). • Integrity of data across the entire dataset. • Integrity of data when changing data in a cell.
Correctness of data	The extent to which the data in a dataset corresponds to reality. Or: Closeness of agreement between a property value and the true value. Bron: ISO 8000-2:2012 (2012).
Linkability of records in a dataset	The extent to which a dataset can be linked to another dataset. Note: This depends on the presence and correctness of linking data in a dataset.
Plausibility of data	The extent to which data are credible. Related: Correctness of data.
Punctuality of the time of delivery of a dataset	The extent to which a dataset is provided at the agreed time. Related: Timeliness of the time of delivery of a dataset.
Stability of a dataset with data over a time period or point in time	The extent to which the data and entities in a dataset that relate to a particular point in time or period of time are subject to change. Example of an unstable dataset: There are multiple deliveries of datasets over the same period or at the same time. Its content is always different.

Focus area	Definition
Timeliness of the time of delivery of a dataset	The period between the end of the time period or the point in time to which the data relates and the time when the data is delivered. Note: There is a relationship with the timeliness of the data. Datasets that are delivered on time contain up-to-date data. Related to: The timeliness of the data in a dataset.
Accessibility of a dataset	The ease with which an information consumer has access to a dataset.
Completeness of the data in a dataset	The extent to which the dataset is filled (i.e.: not empty) is.
Completeness of the records of a dataset	The extent to which all intended records are in the dataset.

Appendix 4: Overview of the guidelines

This appendix contains an overview of all the guidelines as elaborated in Appendix 5. The overview can serve as a basis for a checklist.

Level 1: Part
Level 2: Object
Level 3: Attention area = Object and associated property
Level 4: Guideline (standard)

No	Part/Object/Sphere of Interest/Guideline
Part I	**Information consumer**
1	**Information consumer relations and communication**
1.1	**Effectiveness of the relationship and communication with information consumers**
1.1.1	Communication with information consumers has been streamlined.
1.1.2	There is periodic structural consultation with information consumers.
2	**Agreements with information consumers**
2.1	**Existence of agreements with information consumers**
2.1.1	There are agreements with all information consumers.
2.2	**Timeliness and validity of agreements with information consumers**
2.2.1	Agreements with information consumers are current and valid.
2.3	**Completeness of agreements with information consumer**
2.3.1	In the information products are specified in the agreements.
2.3.2	The agreements specify the properties of the data or information that are relevant to the information consumer.
2.3.3	The properties of the delivery of the dataset are specified in the agreements.
2.3.4	The medium and format of the dataset are specified in the agreements.
2.3.5	The agreements state which reports are requested by the information consumer.
2.3.6	The agreements state how the information consumer is required to deal with confidential information.
2.3.7	The agreements state how long the information processor and the information consumer will retain files.
2.3.8	The agreements contain a description of how the acceptance of datasets takes place.
2.3.9	The agreements state how changes, deviations (incidents) and changing requirements of information consumers are dealt with.
2.3.10	The contact persons of the information consumer and the information processor are noted in the agreements.
2.3.11	The agreements state who is responsible for the quality of the data supplied.
2.3.12	The agreements state how feedback takes place and about what.
2.4	**Clarity and unambiguity of agreements with information consumers**
2.4.1	The agreements are sufficiently clear and unambiguous.
Part II:	**Output**
3	**Content of the dataset**
3.1	**Usability of the contents of the dataset**
3.1.1	The content of the dataset is usable by the information consumer.
4	**Dataset**
4.1	**Stability of the dataset**
4.1.1	The dataset is sufficiently stable.
4.2	**Processability of the dataset**

No	Part/Object/Sphere of Interest/Guideline
4.2.1	The dataset can be processed by the information consumer.
5	**Records in a dataset**
5.1	**Completeness of records in a dataset**
5.1.1	It is known how many records the dataset should contain.
5.1.2	It is known how many records are actually in the dataset.
5.2	**Linkability of the records in a dataset**
	See 3.1 and 6.5.
6	**Data in a dataset**
6.1	**Completeness of the data in a dataset**
6.1.1	The data in the dataset are sufficiently complete.
6.2	**Integrity of the data in a dataset**
6.2.1	The data in a dataset have sufficient integrity.
6.3	**Consistency of the data in a dataset**
6.3.1	The data in a dataset are sufficiently consistent.
6.4	**Plausibility of the data in a dataset**
6.4.1	The data in a dataset is plausible.
6.5	**Correctness of the data in a dataset**
6.5.1	The data in a dataset are sufficiently correct.
6.6	**Format of the data in a dataset**
6.6.1	The format of the data in a dataset complies with the agreed standard.
6.7	**Verifiability of the data in a dataset**
6.7.1	It is possible to check how the data were created.
6.8	**Reproducibility of the data in a dataset**
6.8.1	The data can be reproduced.
7	**Delivery of the dataset**
7.1	**Timeliness of the time of delivery of the dataset**
7.1.1	The dataset can be delivered within a reasonable time after the end of the reference period (actual data).
7.2	**Punctuality of the time of delivery of the dataset**
7.2.1	The dataset will be delivered at the agreed time.
7.3	**Continuity of supply of the dataset**
7.3.1	The continuity of the delivery of the dataset to the information consumer is guaranteed.
8	**Reports to information consumers**
8.1	**Availability of reports to information consumers**
8.1.1	There are reports to information consumers.
8.2	**Correctness and validity of reports to information consumers**
8.2.1	The reports to information consumers are correct and valid.
8.3	**Completeness of reports to information consumers**
8.3.1	The reports contain all agreed information.
8.4	**Punctuality of the time of delivery of reports to information consumers**
8.4.1	Reports to information consumers are delivered on time.
Part III	**Information processing**
9	**Information processor**
9.1	**Transparency of the information processor to information consumer about the information processing process**

No	Part/Object/Sphere of Interest/Guideline
9.1.1	If required, the information processor will provide the information consumer with information about the process.
10	**Tasks, responsibilities and powers**
10.1	**Clarity of tasks, responsibilities and authorities**
10.1.1	It's clear who owns the data in the process.
10.1.2	It is clear who owns the information processing processes.
11	**Management process**
11.1	**Existence and operation of planning processes**
11.1.1	There are planning processes at all relevant levels.
11.2	**Existence and operation of control processes**
11.2.1	There are checks whether the planned results are being achieved.
11.3	**Existence and operation of improvement processes**
11.3.1	Improvement processes have been implemented.
11.4	**Existence and functioning of an assessment process in case of dilemmas**
11.4.1	A process has been implemented for weighing up dilemmas.
12	**Information Processing process**
12.1	**Completeness, existence and operation of the information processing process**
12.1.1	There is a data collection process or an input process.
12.1.2	There is a process of transforming data from input to output.
12.1.3	There is a process of storing, archiving and destroying datasets.
12.1.4	There is a process of delivering output to the information consumer.
12.2	**Efficiency of the information processing process**
12.2.1	The information processing process has been set up as efficiently as possible.
12.3	**Turnaround time of the information processing process**
12.3.1	The turnaround time of the information processing process has been optimised.
12.4	**Continuity of the information processing process**
12.4.1	The continuity of the information processing process is guaranteed.
12.5	**Conformity of the information processing process with the GDPR**
12.5.1	The information processing process is carried out in accordance with the GDPR.
13	**Other processes**
13.1	**Existence and operation of processes for checking the quality of datasets in the information processing process**
13.1.1	Processes have been implemented to analyse the quality of datasets in the process.
13.2	**Existence and operation of incident management processes and problem management processes**
13.2.1	Incident management processes and problem management processes have been implemented.
13.3	**Existence and operation of processes for correcting errors in the output**
13.3.1	Processes for correcting errors in the output have been implemented.
13.4	**Existence and operation of processes for communicating with the information consumer about output problems.**
13.4.1	Processes have been implemented on communication with the information consumer about problems with the output.
13.5	**Existence and operation of change management processes**
13.5.1	Change management processes have been implemented.
13.6	**Existence and operation of processes for answering information consumer questions**

No	Part/Object/Sphere of Interest/Guideline
13.6.1	Processes for answering information consumer questions have been implemented.
13.7	**Existence and operation of feedback processes**
13.7.1	Feedback processes have been implemented.
13.7.2	The information processor processes feedback from the information consumer.
13.7.3	The information processor gives feedback to the supplier.
14	**Description of the content of datasets**
14.1	**Availability of descriptions of contents of datasets**
14.1.1	The descriptions of the content of datasets are available to employees and information consumers.
14.2	**Timeliness of the description of the contents of datasets**
14.2.1	The descriptions of the content of datasets are up to date.
14.3	**Completeness of the description of the contents of datasets**
14.3.1	The descriptions of the contents of datasets are complete.
14.4	**Clarity and unambiguity of the description of the content of datasets**
14.4.1	The descriptions of the content of datasets are clear and unambiguous.
15	**Dataset in the process**
15.1	**Confidentiality of data in the process**
15.1.1	Access to data in the process is restricted.
15.2	**Availability of data in the process for ad hoc analysis**
15.2.1	Data in the process are available for ad hoc analysis.
16	**Documentation**
16.1	**Availability and accessibility of documentation set**
16.1.1	The documentation set is available and accessible to all employees who need it.
16.2	**Completeness of the documentation set**
16.2.1	The documentation set is complete.
16.3	**Clarity of the documentation set**
16.3.1	The documentation set is clear.
16.4	**Correctness and validity of each document**
16.4.1	Every document is current and valid.
16.5	**Completeness of each document**
16.5.1	Every document is complete.
16.6	**Clarity and unambiguity of each document**
16.6.1	Each document is clear and unambiguous.
17	**Quality indicators**
17.1	**Completeness of the set of quality indicators**
17.1.1	A complete set of quality indicators has been compiled.
17.2	**Relevance of quality indicators**
17.2.1	Each quality indicator is relevant.
18	**Internal quality reports**
18.1	**Usability of internal quality reports**
18.1.1	Internal quality reports contain all relevant data.
18.2	**Timeliness of the time of delivery of Internal quality reports**
18.2.1	Internal quality reports are delivered on time.
19	**User interface**
19.1	**Validity of the user interface**

No	Part/Object/Sphere of Interest/Guideline
19.1.1	The questions in the user interface are valid.
19.2	**User-friendliness of the user interface**
19.2.1	The user interface is user-friendly.
19.3	**Completeness and relevance of the user interface**
19.3.1	The questions in the user interface are complete and relevant.
20	**Rules**
20.1	**Completeness of the set of rules**
20.1.1	The set of rules is complete.
20.2	**Relevance of the rules**
20.2.1	Every rule is relevant.
20.3	**Soundness of the rules**
20.3.1	The rules are sound.
20.4	**Availability of the description of the rules**
20.4.1	The description of the rules is available to all concerned.
20.5	**Clarity of the description of the rules**
20.5.1	The rules are laid down in a clear manner.
20.6	**Clarity and unambiguity of the description of the rules**
20.6.1	Each rule is clearly and unambiguously described.
20.7	**Accuracy and completeness of the description of the rules**
20.7.1	Each rule is correctly described.
20.7.2	Each rule is fully described.
20.8	**Accuracy and completeness of the implementation of the rules**
20.7.1	The rules have been properly implemented.
20.7.2	The rules are fully implemented.
Part IV	**Input**
21	**Content of the dataset**
21.1	**Usability of the contents of the dataset**
21.1.1	The content of the dataset is useable by the information processor.
22	**Dataset**
22.1	**Stability of the dataset**
22.1.1	The dataset is sufficiently stable.
22.2	**Processability of the dataset**
22.2.1	The dataset can be processed by the information processor.
23	**Records in a dataset**
23.1	**Completeness of records in a dataset**
23.1.1	It is known how many records the dataset should contain.
23.1.2	It is known how many records are actually in the dataset.
23.2	**Linkability of the records in a dataset**
23.2.1	See presence of the correct link variables (21.1) and correctness of the (values) of the link variables (24.5).
24	**Data in a dataset**
24.1	**Completeness of the data in a dataset**
24.1.1	The data is the dataset are sufficiently complete.
24.2	**Integrity of the data in a dataset**
24.2.1	The data in a dataset have sufficient integrity.

No	Part/Object/Sphere of Interest/Guideline
24.3	**Consistency of the data in a dataset**
24.3.1	The data in a dataset are sufficiently consistent.
24.4	**Plausibility of the data in a dataset**
24.4.1	The data in a dataset is plausible.
24.5	**Correctness of the data in a dataset**
24.5.1	The data in a dataset are sufficiently correct.
24.6	**Format of the data in a dataset**
24.6.1	The format of the data in a dataset complies with the agreed standard.
24.7	**Verifiability of the data in a dataset**
24.7.1	It is possible to check how the data were created.
24.8	**Reproducibility of the data in a dataset**
24.8.1	The data can be reproduced.
25	**Delivery of the dataset**
25.1	**Timeliness of the time of delivery of the dataset**
25.1.1	The dataset can be delivered within a reasonable time after the end of the reference period (actual data).
25.2	**Punctuality of the time of delivery of the dataset**
25.2.1	The dataset is delivered by the supplier at the agreed time.
25.3	**Continuity of supply of the dataset**
25.3.1	The continuity of the supply of the dataset by the supplier is guaranteed.
26	**Supplier reports**
26.1	**Availability of reports from the suppliers**
26.1.1	There are reports from the suppliers.
26.2	**Correctness and validity of the suppliers' reports**
26.2.1	The suppliers' reports are correct and valid.
26.3	**Completeness of suppliers' reports**
26.3.1	The reports contain all agreed information.
26.4	**Punctuality of the time of delivery of reports from suppliers**
26.4.1	Suppliers' reports are delivered on time.
Part V	**Supplier**
27	**Relationship and communication with information suppliers**
27.1	**Effectiveness of the relationship and communication with information suppliers**
27.1.1	Communication with information suppliers has been streamlined.
27.1.2	There is periodic and structural consultation with the suppliers of information.
28	**Agreements with information suppliers**
28.1	**Existence of agreements with information suppliers**
28.1.1	There are agreements with all the suppliers.
28.2	**Timeliness and validity of agreements with information suppliers**
28.2.1	Agreements with suppliers are current and valid.
28.3	**Completeness of agreements with information suppliers**
28.3.1	The information products are specified in the agreements.
28.3.2	The agreements specify the properties of the information that are relevant to the information processor.
28.3.3	The properties of the delivery of the dataset are specified in the agreements.
28.3.4	The medium and format of the dataset are specified in the agreements.
28.3.5	The agreements state which reports to the information processor are required.

No	Part/Object/Sphere of Interest/Guideline
28.3.6	The agreements state how the information processor is required to deal with confidential information.
28.3.7	The agreements contain a description of how the acceptance of the datasets takes place.
28.3.8	The agreements state how changes (changes), deviations (incidents) and changing requirements of the data processor will be dealt with.
28.3.9	The contact persons of the information processor and the supplier are noted in the agreements.
28.3.10	The agreements state who is responsible for the quality of the data.
28.3.11	The agreements state how feedback takes place and about what.
28.4	**Clarity and unambiguity of agreements with information suppliers**
28.4.1	The agreements are sufficiently clear and unambiguous.
29	**Measuring systems**
29.1	**Availability of the measuring system**
29.1.1	The measuring system is sufficiently available.
29.2	**Reliability of the measuring system**
29.2.1	The measuring system is reliable.
Part VI	**Resources**
30	**Employees/staff**
30.1	**Personnel capacity**
30.1.1	There is sufficient staff capacity to carry out the process.
30.2	**Competence of the employees**
30.2.1	The group of employees who carry out the process is sufficiently competent.
31	**Knowledge**
31.1	**Availability of knowledge**
31.1.1	The knowledge required to carry out the process is available.
32	**IT infrastructure**
32.1	**Availability of the IT infrastructure**
32.1.1	The IT infrastructure is sufficiently available.
32.2	**Continuity of the IT infrastructure**
32.2.1	The continuity of the IT infrastructure is sufficiently guaranteed.
32.3	**Performance of the IT infrastructure**
32.3.1	The performance of the IT infrastructure is sufficiently high.
33	**Information systems**
33.1	**Conformity of information systems with information security standards**
33.1.1	The information systems comply with a standard in the field of information security.
33.2	**Functionality of the information systems**
33.2.1	The information systems have the right functionality.
33.3	**Processing speed of the information systems**
33.3.1	The information systems process the data quickly enough.
33.4	**Adequacy of the database structure of the information systems**
33.4.1	The database structure is adequate.
33.5	**Adaptability of the information systems**
33.5.1	Information systems can be adapted relatively easily to user requirements and regulatory changes.

Appendix 5: Guidelines

This appendix sets out the guidelines. The Appendix consists of the following six parts:

I Information consumer
II Output
III Information processing
IV Input
V Supplier
VI Resources

Part I: Information consumer

Part I contains guidelines for the quality of the following objects:

- Information consumer relations and communication
- Agreements with information consumers.

1. Information consumer relations and communication

In this chapter, guidelines have been formulated for the following property:
- Effectiveness

Target:
- Information consumer satisfaction.

1.1 Effectiveness of the relationship and communication with information consumers

1.1.1 Communication with information consumers has been streamlined.

Assessment criteria:
- Account management is implemented. This is useful in the case of large numbers of information consumers within one organisation or large numbers of information processing departments within one organisation.
- Account managers have the task of initiating communication between parties and solving any communication problems.
- There are user groups or information consumer panels.

1.1.2 There is regular and structural consultation with information consumers.

Assessment criterion:
- The information processor and information consumers meet regularly to evaluate and, if necessary, adjust agreements.

2. Agreements with information consumers

In this chapter, guidelines have been formulated for the following properties:
- Existence
- Timeliness and validity
- Completeness
- Clarity and unambiguity

Target:
- Quality of the output
- Information consumer satisfaction

Explanatory notes:
- Agreements can take various forms or have names such as covenants, contracts, protocols, assignments, service level agreements and partnerships.
- Agreements can also be divided into different levels, each with its own mutation rate. For example:
  - Agreements at strategic level: legal basis, principles such as good practice, parties involved. These arrangements rarely change.
  - Agreements at tactical level (service level): product specification, delivery date, etc. These agreements will change within 1-3 years.
  - Agreements at operational level (technical): formats, record format, etc. These can change daily or on an ad hoc basis.

2.1 Existence of agreements with information consumers

2.1.1 There are agreements with all information consumers.

Explanatory notes:
- In the case of large numbers of information consumers, there may be unilateral terms: in the form of general terms and conditions of supply with regard to information.

Assessment criterion:
- Agreements have been made with all information consumers and these are recorded in writing.

Reference:
- NORA. AP28 Service provider and information consumer have agreed on the delivery of the service.

2.2 Timeliness and validity of agreements with information consumers

2.2.1 Agreements with information consumers are current and valid.

Explanatory notes:
- In the case of large numbers of information consumers, there may be unilateral terms: in the form of general terms and conditions of supply with regard to information.

Assessment criteria:
- Agreements are signed or confirmed by the information consumer and the information processor.
- The validity period of the agreements has not expired or the agreements are not older than five years.

2.3 Completeness of agreements with information consumers

2.3.1 The information products are specified in the agreements.

Assessment criteria:
- The content of the dataset is specified (product specification)
- In the description of the content the following are stated:
  - the type of entities (entities) of which the dataset consists,
  - which set of entities the dataset contains (population),
  - which variables are included in the dataset and what they mean,
  - the period or point of time of the dataset, and
  - the classification systems that have been used.

2.3.2 The agreements specify the properties of the data that are relevant to the information consumer.

Explanatory notes:
- Examples of properties are: consistency of the data, integrity of the data, correctness of the data, stability of a dataset, format of the data, completeness of the data, completeness of the records. See Appendix 3 for the complete list of properties and their definition.

Assessment criteria:
- Properties are explicitly named.
- For each property, the requirements to be met by this property are specified.

2.3.3 The properties of the delivery of the dataset are specified in the agreements.

Explanatory notes:
- This includes the delivery time and an indication of how critical this time is for the information consumer.
- Agreements can also be made about the medium through which the information is supplied and the format in which the datasets are supplied.

2.3.4 The medium and format of the dataset are specified in the agreements.

Explanatory notes:
- Examples of media are data communication via Internet, USB stick and CD.
- Examples of formats are ASCII, Access table, XML.

2.3.5 The agreements state which reports are requested by the information consumer.

Explanatory notes:
- The reports can contain various metadata:
  - Administrative metadata such as the names of the files and the production date.
  - Conceptual metadata: Description of the content of datasets such as the names and definitions of the variables and the period to which the data relate.
  - Process metadata such as checks that have taken place on the data.
  - Quality metadata such as the number of records, a measure of the missing data and the delivery date and time. The number of corrections made and any adjustments to previously delivered data.
- It goes without saying that the quality metadata will be in line with the agreed quality of the data.

2.3.6 The agreements state how the information consumer is required to deal with confidential information.

Explanatory notes:
- In the case of personal data, the Dutch Personal Data Protection Act (Wet Bescherming Persoonsgegevens) applies to the information consumer.
- The information consumer must protect the privacy of citizens and businesses.

2.3.7 Agreements state how long the information processor and the information consumer will retain files.

Explanatory notes:
- The information consumer may need redelivery of the output, with or without adjustments.
- The information processor may find it desirable that his output is not kept too long by the information consumer.

2.3.8 The agreements contain a description of how the acceptance of datasets takes place.

Assessment criterion:
- An acceptance procedure has been described. It states which criteria the information consumer applies for acceptance and what he does if criteria are not met.

2.3.9 The agreements state how changes, deviations (incidents) and changing requirements of information consumers are dealt with.

Explanatory notes:
- The changes and deviations are described and reported. These changes may arise in various areas:
  - Administrative metadata
  - Description of the content of datasets
  - Process metadata
  - Quality of the data
  - Delivery dates
- It is also possible to describe who will be informed of changes, and when.
- This may involve changes and deviations on the part of the information processors as well as on the part of the information consumer.

2.3.10 The contact persons of the information consumer and the information processor are noted in the agreements.

Explanatory notes:
- There may be contacts on several levels: strategic, tactical and operational. This applies to both the information consumer and the supplier.
- Contact persons at strategic level approve and sign the agreements.

2.3.11 The agreements state who is responsible for the quality of the data supplied.

Explanatory notes:
- Someone is accountable for the quality of the data.
- This officer is also authorised to take action if the quality of the data is insufficient.
- In principle, this officer could also sign for approval of each delivery.

2.3.12 The agreements state how feedback takes place and about what.

Explanatory notes:
- This mainly concerns feedback from the information consumer to the information processor.
- Feedback can, for example, relate to the quality of the product, but also to the quality of the delivery process and the communication between the information processor and the information consumer.

2.4 Clarity and unambiguity of agreements with information consumers

2.4.1 The agreements are sufficiently clear and unambiguous.

Explanatory notes:

- Clarity and unambiguity are especially necessary for the description of the content of the dataset. Otherwise, there may be differences in interpretation between the information consumer and the information processor, with possible negative consequences for the information consumer. Recovery actions can in turn have consequences for the information processor and even the supplier to the information processor.

Assessment criterion:

- The agreements have been critically assessed by the information consumer and the suppliers for clarity and unambiguity.

Part II: Output

Part II describes guidelines for the quality of the following objects:

- Content of the dataset
- Dataset
- Records in a dataset
- Data in a dataset
- Delivery of a dataset
- Reports to information consumers

A distinction is made between these output objects because they each have their own set of properties on which quality is assessed.

3. Content of the dataset (output)

In this chapter, guidelines have been formulated for the following property:
- Usability (or relevance)

Target:
- Information consumer satisfaction.

Explanatory notes:
- The content of the dataset is determined by:
  - the type of entities (entities) of which the dataset consists,
  - the collection of entities contained in the dataset (population),
  - the variables included in the dataset and their meaning,
  - the time period or point in time covered by the dataset, and
  - the classification systems used.
- In addition to the content of the dataset, the quality of the *description* of the content of the dataset is relevant. This will be considered in chapter 13 of the Code.

3.1 Usability of the contents of the dataset

3.1.1 The content of the dataset is usable by the information consumer.

Assessment criteria:
- The dataset contains the correct type of entities (person, company, address change).
- The dataset contains the correct set of entities (population).
- The dataset contains the correct variables. Connectivity of a dataset, for example, depends on the correct link variable(s).
- The dataset does not contain more entities and variables than necessary to avoid excess.
- The dataset covers the correct time period or point in time.
- The correct classification system has been applied.

Example:
- The information consumer receives a dataset with all address changes. This also includes mutations that have occurred as a result of municipal reorganisation. However, the information consumer actually needs relocation information. The dataset is therefore not usable. The content of the dataset is not sufficiently relevant.
- The information consumer receives a dataset with interest paid by persons. However, the information consumer actually needs a dataset with tax deductible interest. The dataset is therefore not usable without additional data. The content is not sufficiently relevant.

Reference:
- NORA. AP19: The service has been set up from the perspective of the information consumer.

4. Dataset(output)

In this chapter, guidelines have been formulated for the following property:
- Stability
- Processability

Target:
- Information consumer satisfaction

4.1 Stability of the dataset

4.1.1 The dataset is sufficiently stable.

Assessment criterion:
- Successive versions of the dataset (provisional and definitive data) do not differ too much from each other.

4.2 Processability of the dataset

4.2.1 The dataset can be processed by the information consumer.

Assessment criteria:
- The dataset is in the agreed format.
- The dataset is delivered on/via the agreed medium.

5. Records in a dataset (output)

In this chapter, guidelines have been formulated for the following properties:
- Completeness
- Connectivity

Target:
- Information consumer satisfaction.

5.1 Completeness of records in a dataset

5.1.1 It is known how many records the dataset should contain.

Assessment criteria:
- It is clear which or how many records should be present.
- Runs must be able to be resumed after an interruption.

Example:
- The collection of all companies subject to VAT is known.

5.1.2 It is known how many records are actually in the dataset.

Assessment criterion:
- The number of records in the dataset is counted by the supplier or the information consumer.

Example:
- A dataset contains VAT data. However, the VAT data of 12,000 companies have not yet been received.

5.2 Linkability of the records in a dataset

The linkability of records in a dataset depends on the presence of the appropriate link variables in the dataset (3.1) and the correctness of the link variables (6.5).

6. Data in a dataset (output)

In this chapter, guidelines have been formulated for the following properties:
- Completeness
- Integrity
- Consistency
- Plausibility
- Correctness
- Format
- Verifiability
- Reproducibility

Target:
- Information consumer satisfaction.

6.1 Completeness of the data in a dataset

6.1.1 The data in the dataset are sufficiently complete.

Explanatory notes:
- Data is not complete if data is missing from the dataset, when values should be present ('missing values').
- The phenomenon of missing data corresponds to item non-response.

Assessment criterion:
- The completeness of the data in the dataset corresponds to the agreements made with the information consumer.

Example:
- In a file of address data the house number is not always entered.

6.2 Integrity of the data in a dataset

6.2.1 The data in a dataset have sufficient integrity.

Explanatory notes:
- A distinction can be made between integrity of one field, between fields of one entity, between records within the dataset and across datasets.
- Referential integrity occurs when files are properly linked, e.g. all employees are linked to a file with department names.

Assessment criteria:
- The integrity of the data has been checked on the basis of rules.

6.3 Consistency of the data in a dataset

6.3.1 The data in a dataset are sufficiently consistent.

Assessment criteria:
- There is consistency with data about the same entity in previous periods. There is not too much divergence.
- There is consistency between preliminary and final data. There is not too much divergence.
- There is consistency with data from other datasets with the same content. The data of these datasets are not very different.

6.4 Plausibility of the data in a dataset

6.4.1 The data in a dataset is plausible.

Explanatory notes:
- Plausibility is a special form of consistency. This involves comparing data with data that describe related phenomena in reality.

Assessment criteria:
- The data have been compared - if possible - with data in other datasets.
- The differences are reasonable.

6.5 Correctness of the data in a dataset

6.5.1 The data in a dataset is sufficiently correct.

Explanatory notes:
- The correctness of data can only be established by testing data against reality or on the basis of the assessment of the source (for example, in the case of a basic register system).
- The connectivity capability of a dataset depends on the (presence and) correctness of link variable(s).

Assessment criteria:
- There is a process to check the correctness of data in the dataset. This may also be done on a random basis.

6.6 Format of the data in a dataset

6.6.1 The format of the data in a dataset complies with the agreed standard.

Explanatory notes:
- Personal names and street names can be written in different ways. For example, Apolloln or Apollolaan.

Example:
- The street name is abbreviated to 24 characters according to NEN 5825.

References:
- NEN 1888 (2002). Standard for general personal data.
- NEN 5825 (2002). Standard for address information.

6.7 Verifiability of the data in a dataset

6.7.1 It is possible to check how the data were created.

Explanatory notes:

- For example, an information processor should be prepared for legal proceedings in the event of a dispute.

Assessment criterion:

- The source material for the data is available for as long as the information consumer or other interested party may request delivery of the source material or wants to know how the output was created.

6.8 Reproducibility of the data in a dataset

6.8.1 The data can be reproduced.

Assessment criteria:

- It is known which version of the input file has been used.
- It is known which version of the software has been used.
- It is known which manual changes have taken place during processing.

7. Delivery of the dataset (output)

In this chapter, guidelines have been formulated for the following properties:
- Timeliness of the time of delivery
- Punctuality of the time of delivery
- Continuity of supply

Target:
- Information consumer satisfaction.

7.1 Timeliness of the time of delivery of the dataset

7.1.1 The dataset can be delivered within a reasonable time after the end of the reference period (actual data).

Explanatory notes:
- The reference period is the time period to which the data refer. This can also be a point in time.
- The desired timeliness of the time of delivery can vary from immediately after update to a few months after the end of a calendar year of an annual file.

Assessment criteria:
- The information processor knows the importance to the consumer of the data being up-to-date.

7.2 Punctuality of the time of delivery of the dataset

7.2.1 The dataset will be delivered at the agreed time.

Explanatory notes:
- Punctuality is relevant for every delivery.

Assessment criterion:
- The datasets have been delivered on time for the last 12 months.

7.3 Continuity of supply of the dataset

7.3.1 The continuity of the delivery of the dataset to the information consumer is guaranteed.

Explanatory notes:
- The continuity of delivery of the dataset depends on:
  - Continuity of the information processing process
  - Existence and operation of incident and calamity management processes.

8. Reports to information consumers

In this chapter, guidelines have been formulated for the following properties:
- Availability
- Correctness and validity
- Completeness
- Punctuality of the time of delivery

Target:
- Information consumer satisfaction.

Explanatory notes:
- Reports to information consumers are also called quality reports or 'packing slips' or 'waybills'.

8.1 Availability of reports to information consumers

8.1.1 There are reports to information consumers.

Explanatory notes:
- There may also be self-evident reports that are not mentioned in the agreements. However, information consumers and information processors may have different views on what constitutes self-evident reporting. In order to avoid conflicts, it therefore makes sense to make agreements about reporting to information consumers.

Assessment criterion:
- The agreed quality reports are and will be delivered.

8.2 Correctness and validity of reports to information consumers

8.2.1 The reports to information consumers are correct and valid.

Assessment criterion:
- The reports by the suppliers are checked.

8.3 Completeness of reports to information consumers

8.3.1 The reports contain all agreed information.

Assessment criterion:
- All the information about reports contained in the agreements is also included in the reports to the information consumer.

8.4 Punctuality of the time of delivery of reports to information consumers

8.4.1 Reports to information consumers are delivered on time.

Assessment criterion:
- Reports are delivered at the same time as the dataset.

Part III: Information processing

Part III formulates guidelines for the quality of the following objects:

- Information processor
- Tasks, responsibilities and authorisations
- Information Processing Process
- Other processes
- Description of the contents of the datasets
- Dataset in the process
- Documentation
- Quality indicators
- Internal quality reports
- User interface
- Rules

9. Information processor

In this chapter a guideline is formulated for the following property:

- Transparency of the information processor about the information processing process

Target:

- Information consumer confidence in the organisation and its products.

9.1 Transparency of the information processor to the information consumer about the information processing process

9.1.1 If required, the information processor will provide the information consumer with information about the process.

Assessment criterion:

- Relevant information about the process is shared with the information consumer, if the information consumer so requests.

10. Tasks, responsibilities and powers

In this chapter, guidelines have been formulated for the following property:
- Clarity

10.1 Clarity of tasks, responsibilities and authorities

10.1.1 It's clear who owns the data in the process.

Assessment criteria:
- For each dataset in the information processing process it is clear who the owner is.
- The tasks, responsibilities and powers of the dataset owner are described in a formal document.

Explanation
- Sometimes the ownership is determined per variable in a dataset. For example, in the case of a information consumer database.
- The owner is responsible for the quality of the data in the dataset. He must have a natural interest in the proper quality of the data.

10.1.2 It is clear who owns the information processing processes.

Assessment criteria:
- For each information processing process it is clear who the owner is.
- The tasks, responsibilities and powers of the owner of a process are described in a formal document.

11. Management process

In this chapter, guidelines have been formulated for the following properties:
- Existence and operation of planning processes
- Existence and operation of control processes
- Existence and operation of improvement processes
- Existence and operation of weighing process

Target:
- Satisfaction of owners and sponsors.

Reference:
- NORA. AP32 Quality of service management is anchored at the highest level of the organisation.

The information processing process is discussed in the next chapter.

11.1 Existence and operation of planning processes

11.1.1 There are planning processes at all relevant levels.

Explanatory notes:
- Plans include agreements on which results will be delivered when and what the quality of these results will be.
- At operational level, these results relate to the output of the information processing process.
- Agreements with suppliers and information consumers are also the result of a planning process.
- This concerns the P of the PDCA cycle: Plan.

Assessment criteria:
- There is a planning process at strategic, tactical and operational level.
- The output of the planning process is a description of the planned results, the timing of their completion and the required quality of these results.

11.2 Existence and operation of control processes

11.2.1 There are checks whether the planned results are being achieved.

Explanatory notes:
- Controls can be carried out on the output, but also on the input and on intermediate results.
- This involves both monitoring the progress and the quality of the result.
- This concerns the C of the PDCA cycle: Check.

Assessment criteria:
- The control processes are described.
- The control processes are implemented as described.
- Checks are carried out as early as possible in the process.
- Audit trails are available.

11.3 Existence and operation of improvement processes

11.3.1 Improvement processes have been implemented.

Explanatory notes:
- If the actual results deviate from the planned results, this may lead to improvement actions.
- This concerns the A of the PDCA cycle: Act.

Assessment criteria:
- The improvement processes have been described.
- The improvement processes are implemented as described.

11.4 Existence and functioning of an assessment process in case of dilemmas

11.4.1 A process has been implemented for weighing up dilemmas.

Explanatory notes:
- There is a trade-off between on-time delivery (punctuality of the time of delivery) and inherent quality aspects such as completeness and correctness of the data.
- If more time is available, there is more room to further improve the inherent quality of the output.
- If the information consumer wants to receive data more quickly, this can lead to a reduction in the quality of the output. However, this lower quality may still be sufficient for the information consumer.
- This consideration can be made in the planning process as well as in the case of an incidental delay in delivery.
- An overview of the added value of each process step is useful in the assessment process. See 16.2 Completeness of the documentation set.

Assessment criteria:
- The assessment process has been described.
- The process is implemented as described.

12. Information Processing process

In this chapter, guidelines have been formulated for the following properties:
- Completeness, existence and operation
- Efficiency
- Turnaround time
- Continuity
- Conformity with the GDPR

Effectiveness (the process delivers what it should deliver) is not mentioned. This is already covered in Part II: Output.

Target:
- Satisfaction of owners and sponsors.
- Information consumer satisfaction.
- Public confidence in the organisation.

12.1 Completeness, existence and operation of the information processing process

12.1.1 There is a data collection process or an input process.

Explanatory notes:
- Data collection occurs when data is requested directly from individuals or organisations ('primary observation'). The supplier is then an individual person or organisation.
- Data collection also occurs when automated measurements are taken, such as the collection of traffic data via traffic loops, the registration of cash register transactions and of calls by telephone exchanges.
- Import occurs when the supplier of datasets supplies and has collected all the data himself ('secondary observation'). For example, the Chamber of Commerce supplies Statistics Netherlands (CBS).

Assessment criteria:
- The process of data collection or entering datasets is described.
- The process is implemented as described.

12.1.2 There is a process transforming data from input to output.

Explanatory notes:
- The purpose of this process is to process the data entered into information for the information consumer.

Assessment criteria:
- The process from input to output has been described.
- The process is implemented as described.

12.1.3 There is a process of storing, archiving and destroying datasets.

Explanatory notes:
- The aim of this process is to guarantee the availability of the data, but also to destroy the data in a timely manner.

Assessment criteria:
- The process of saving and archiving has been described.
- The process of data destruction has been described.
- The process is implemented as described.
- The retention periods of datasets are made explicit.

Reference:
- Archives Act (1995).
- ICTU. Baseline Information Management National Office.

12.1.4 There is a process of delivering output to the information consumer.

Explanatory notes:
- The aim of this process is to ensure that the information consumer receives the datasets in accordance with the agreements.
- Monitoring the agreements with the information consumer is discussed elsewhere. These are the actions needed to deliver the output.

Assessment criteria:
- The process of delivering output has been described.
- The process is implemented as described.

12.2 Efficiency of the information processing process

12.2.1 The information processing process has been set up as efficiently as possible.

Explanatory notes:
- Efficiency improves the quality of the output.

Assessment criteria:
- IT has been optimally deployed. Routine operations are automated.
- Standards are used in areas relevant to the process. These can be internal or external standards.
- Generic services are used wherever possible.

12.3 Turnaround time of the information processing process

12.3.1 The turnaround time of the information process has been optimised.

Explanatory notes:
- The timeliness of the time of delivery of the output strongly depends on the turnaround time of the information processing process.

Assessment criteria:
- There are no unnecessary or avoidable waiting times in the process.
- No duplicate activities or activities with insufficient added value for the information processor and/or information consumer are carried out in the process ('shadow administration').
- A good balance has been chosen between the lead time of the process and the required personnel capacity.
- Good agreements have been made with the suppliers of data about the timely and punctual/punctual delivery of data.

12.4 Continuity of the information processing process

12.4.1 The continuity of the information processing process is guaranteed.

Explanatory notes:
- Continuity of the information processing process is the extent to which the information processing process can withstand calamities.
- Calamities can relate to various components such as personnel, housing and IT. Usually IT gets the most emphasis.

Assessment criteria:
- An emergency plan has been described and implemented (set-up and existence).
- The emergency plan is periodically tested (operation).
- A crisis team has been set up in which, in any event, recovery scenarios are discussed with information consumers.
- There is a plan on how to keep information consumers informed about the course of the calamity.
- There is a fall-back scenario in case of calamities.
- A recovery period has been set and communicated to information consumers.

12.5 Conformity of the information processing process with the GDPR

12.5.1 The information processing process is carried out in accordance with the GDPR.

Explanatory notes:

- In the case of processing personal data, there must be transparency to the outside world as to which data are processed.
- There are several other requirements such as:
  - The data may only be used for the purpose for which it was collected (purpose).
  - No more personal data are collected than is necessary for the purpose (no excess).
  - The data are adequately secured.
  - It is clear who the responsible owner is.

Assessment criteria:

- In the case of the processing personal data, the process is periodically assessed against all the requirements of the GDPR.
- This assessment is recorded in writing.

References:

- GDPR (2016). Personal Data Protection Act.

13. Other processes

In this chapter, guidelines have been formulated for the following properties /areas of interest:

- Existence and operation of incident and problem management processes
- Existence and operation of processes for correcting errors in the output
- Existence and operation of processes for communicating with the information consumer about output problems.
- Existence and operation of change management processes
- Existence and operation of processes for answering information consumer questions.
- Existence and operation of feedback processes

Target:

- Quality of the output.

Reference:

- NORA. AP31 The quality of service is managed on the basis of cyclical feedback.

13.1 Existence and operation of processes for analysing the quality of datasets in the information processing process

13.1.1 Processes have been implemented to analyse the quality of datasets in the process.

Explanatory notes:

- This involves the analysis of datasets in the process. These can be intermediate results, but also registers such as databases with information consumer data, product data ('master data') and the government's basic register systems. See also chapter 15 Dataset in the process.

Assessment criteria

- The quality aspects, as also specified for input and output, are checked.
- The processes have been described.
- The processes are implemented as described.
- The results of the processes lead to improvement actions.

13.2 Existence and operation of incident management processes and problem management processes

13.2.1 Incident management processes and problem management processes have been implemented.

Explanatory notes:

- The aim of the incident management process is to comply with the agreements in the event of incidents.
- The aim of the problem management process is to structurally prevent frequently occurring incidents.

Assessment criteria:

- The incident management processes and problem management processes are described.
- These processes are implemented as described.

13.3 Existence and operation of processes for correcting errors in the output

13.3.1 Processes for correcting errors in the output have been implemented.

Explanatory notes:
- The aim of these processes is to be able to solve an error in the output as quickly as possible.

Assessment criteria:
- The processes for correcting errors in the output are described.
- These processes are implemented as described.
- Errors in the output are evaluated with the aim of taking possible improvement measures.

13.4 Existence and operation of processes for communicating with the information consumer about output problems.

13.4.1 Processes have been implemented on communication with the information consumer about problems with the output.

Explanatory notes:
- The aim of these processes is to minimise damage to the information consumer and not to leave the information consumer uninformed.
- Problems with the output can be: late delivery, errors in the output or other forms of non-compliance with agreements.

Assessment criteria:
- The processes for communication with the information consumer in case of problems with the output are described.
- These processes are implemented as described.
- A problem with the output is reported to the information consumer at the earliest possible stage.
- The information consumer will be informed when the problem is expected to be solved. If necessary, these expectations will be adjusted.
- Provision has been made for consultation with the information consumer in connection with any interim solutions.
- When the problem is solved the information consumer is informed.

13.5 Existence and operation of change management processes

13.5.1 Change management processes have been implemented.

Explanatory notes:
- Changes can relate to all components in the information processing process: processes, software, infrastructure, documentation.

Assessment criteria:
- A change management process has been described.
- This process is implemented as described.
- The purpose of the change management process is to implement changes in processes and systems in a controlled manner, so that no incidents or calamities occur.
- Information consumers will be informed of any changes that affect them.

13.6 Existence and operation of processes for answering information consumer questions

13.6.1 Processes for answering information consumer questions have been implemented.

Explanatory notes:
- These are questions from information consumers about completed deliveries.

Assessment criteria:
- The process for answering the information consumer's questions is described.
- This process is implemented as described.
- The response time for dealing with an information consumer's question is defined.

13.7 Existence and operation of feedback processes

13.7.1 Feedback processes have been implemented.

Explanatory notes:
- This concerns feedback on doubtful cases and incorrect data.
- This concerns both feedback received from the information consumer and giving feedback to the suppliers (of data).

Reference:
- E-government: The basic register systems are subject to the following requirement: "This concerns the **mandatory notification of cases of doubt by the information consumers** to the responsible authority for the basic register system thereby creating self-cleaning databases".

13.7.2 The information processor processes feedback from the information consumer.

Assessment criteria:
- The process handling feedback from information consumers has been described.
- Agreements have been made with the information consumer about giving feedback on the quality of the data.
- The feedback process has been implemented.
- The feedback process aims to improve the quality of the output.

13.7.3 The information processor gives feedback to the supplier.

Assessment criteria:

- The process whereby the information processor gives feedback to the data suppliers has been described.
- Agreements have been made with the data suppliers to provide feedback on the quality of the data.
- The feedback process has been implemented.
- The feedback process aims to improve the quality of the input.

Reference:

- NORA. AP14 Report back to the source holder. In case of reasonable doubt as to the accuracy of information, the service provider shall report this to the responsible source holder.

14. Description of the content of datasets

In this chapter, guidelines have been formulated for the following properties:
- Availability.
- Timeliness.
- Completeness.
- Clarity and unambiguity.

Target:
- Quality of the output.

Reference:
- NORA. AP17: Information objects are systematically described.

14.1 Availability of descriptions of contents of datasets

14.1.1 The descriptions of the content of datasets are available to employees and information consumers.

Assessment criteria:
- The descriptions of the content of the datasets can be consulted by employees involved in the information processing process.
- The descriptions of the contents of the datasets (including the updates) are supplied to the information consumer.

14.2 Timeliness of the description of the contents of datasets

14.2.1 The descriptions of the content of datasets are up to date.

Assessment criteria:
- Each time a dataset is changed, the description of the contents of the datasets is adjusted.

14.3 Completeness of the description of the contents of datasets

14.3.1 The descriptions of the content of datasets are complete.

Assessment criteria:
- The descriptions of the content of the datasets (input, intermediate results and output) in the process are described or can be derived.
- All components of the contents of the datasets are described: entities, population, variables, classification systems and reference period.

14.4 Clarity and unambiguity of the description of the content of datasets

14.4.1 The descriptions of the content of datasets are clear and unambiguous.

Explanatory notes:

- Unambiguity can be at the expense of legibility. Therefore, it is sometimes wise to provide an unambiguous description with a clear explanation.

Assessment criteria:

- The descriptions of the content of the datasets are readable and are understood by employees and information consumers.
- The descriptions of the contents of the datasets are not open to interpretation.

15. Dataset in the process

In this chapter, guidelines have been formulated for the following properties:
- Confidentiality.
- Availability for analysis.

Target:
- Public confidence in the organisation.
- Quality of the output.

Explanatory notes:
- A dataset in the process could include intermediate results, but also registers such as databases with customer data, product data ('master data') and the government's basic register systems.
- For the quality of datasets in the process, the same guidelines apply as for input (chapters 3-6) and output (chapters 21-24). These guidelines are not repeated in this chapter.
- Here too, a distinction can be made between:
  - Content of the dataset
  - Dataset as a whole
  - Records in a dataset
  - Data in a dataset
- The quality of the description of the content of the data is covered in chapter 14.

15.1 Confidentiality of data in the process

15.1.1 Access to data in the process is restricted.

Explanatory notes:
- The 'need to know' principle is applied.

Assessment criteria:
- Access to the data via systems is limited to employees who need to be able to access the data as part of their job.
- Data is only consulted and processed by employees if the process requires it.

15.2 Availability of data in the process for ad hoc analysis

15.2.1 Data in the process are available for ad hoc analysis.

Explanatory notes:
- This guideline is intended to enable 'double-loop' learning and to make ad hoc analyses.

Assessment criteria:
- Datasets are available ad hoc for analysis.
- Ad hoc analytical tools are available for authorised users.

16. Documentation

In this chapter, guidelines have been formulated for the following characteristics/areas of interest:

- Availability and accessibility of the documentation set
- Completeness of the documentation set
- Clarity of the documentation set
- Correctness and validity of each document
- Completeness of each document
- Clarity and unambiguity of each document

Target:

- Continuity of the information processing process

Explanatory notes:

- Documentation contains information about the information processing process as it is in production. It's production-related metadata.
- The documentation covers both the set of documentation as a whole and the individual documents. The set of documentation here means: process descriptions, work instructions and system user manuals.
- The descriptions of the contents of the datasets can also be regarded as documentation. The quality of this is described in a separate chapter.

16.1 Availability and accessibility of the documentation set

16.1.1 The documentation set is available and accessible to all employees who need it.

Assessment criteria:

- The documentation is physically or digitally accessible and easy to find.
- The documentation is accessible to employees who need it.

16.2 Completeness of the documentation set

16.2.1 The documentation set is complete.

Assessment criteria:

- There is a process description of the information processing process.
- There is a concise overview of the steps in the process, the added value of the step for the quality of the output and the steps on the critical path. This overview is useful in making decisions and solving dilemmas in the event of incidents.
- There are work instructions for employees.
- There are user manuals or help functions for systems.
- Tasks, responsibilities and authorities in the production process are described. See also chapter 10.

16.3 Clarity of the documentation set

16.3.1 The documentation set is clear.

Assessment criterion:
- The entire set of documentation is conveniently stored so that the right document is easily findable and quickly accessible.

16.4 Correctness and validity of each document

16.4.1 Every document is current and valid.

Assessment criteria:
- Each time the process or system is modified, the corresponding documentation is adapted at the same time or as quickly as possible.
- It is clear what the version of the document is.
- Each version of a document is critically reviewed.
- Each version of a document is approved by the responsible management.

16.5 Completeness of each document

16.5.1 Every document is complete.

Assessment criterion:
- The document has been critically reviewed for completeness.

16.6 Clarity and unambiguity of each document

16.6.1 Each document is clear and unambiguous.

Explanatory notes:
- Unambiguity can be at the expense of legibility. An optimum must be found here.

Assessment criteria:
- Every document is readable and understood by the employees who use it.
- Documents are not open to multiple interpretations.

17. Quality indicators

In this chapter, guidelines have been formulated for the following properties /areas of interest:

- Completeness of the set.
- Relevance of each quality indicator.

Target:

- Quality of the output.

17.1 Completeness of the set of quality indicators

17.1.1 A complete set of quality indicators has been compiled.

Explanatory notes:

- It is advisable to first determine in which areas of attention the process is to be steered. One or more indicators per area of interest can then be defined and implemented.

Assessment criteria:

- A set of quality indicators has been compiled.
- No indicators critical to the quality of the output are missing.

17.2 Relevance of each quality indicator

17.2.1 Each quality indicator is relevant.

Assessment criterion:

- There is a clear relationship between (the focus of) the indicator and the quality of the output.

18. Internal quality reports

In this chapter, guidelines have been formulated for the following properties:
- Availability
- Correctness and validity
- Completeness
- Punctuality of the time of delivery

Target:
- Quality of the output

Explanatory notes:
- The main purpose of internal quality reports is to be able to focus on quality, but also to be internally accountable. Internal reports can also serve as input for reports to the information consumer.
- Adjustments can take place within a cycle, before delivery of a dataset to the information consumer. Adjustments can also be made in one of the following cycles. In the most far-reaching case, processes and systems have to be adapted.
- A quality report may contain quality indicators.

18.1 Usability of internal quality reports

18.1.1 Internal quality reports contain all relevant data.

Explanatory notes:
- Examples of relevant data are lead time, response time, percentage of missing values.

Assessment criterion:
- The internal quality reports contain all the critical factors that management wants to steer by.

18.2 Timeliness of the time of delivery of internal quality reports

18.2.1 Internal quality reports are delivered on time.

Assessment criterion:
- Reports are delivered at such a time that verification can still take place on time.

19. User interface

In this chapter, guidelines have been formulated for the following properties:
- Validity.
- User-friendliness.
- Completeness and relevance

Target:
- Quality of the input.

Explanatory notes:
- User interface refers to screens, forms and questionnaires.
- On the user interface there are questions that need to be answered. These questions can also take the form of labels such as "Name" or "Date of birth".
- This is the user interface that collects data at the source and provides input for the information processing process.

19.1 Validity of the user interface

19.1.1 The questions in the user interface are valid.

Explanatory notes:
- The validity of a user interface is the extent to which the user interface measures what one wants to measure.

Assessment criteria:
- The questions have been asked in such a way that there is a good chance of an adequate answer.
- The user interface has been tested for validity.
- The depth of the test depends on the importance of the user interface and the number of people needed to fill the user interface.

19.2 User-friendliness of the user interface

19.2.1 The user interface is user-friendly.

Assessment criteria:
- The order of the questions is logical ('flow').
- Non-relevant questions can be skipped or are not visible.
- There is plenty of room for answers.
- There is no request for information that is already known (pre-completion).
- The user interface has been kept as short as possible.
- Explanatory notes to the questions are available.
- OR: The dialogue principles of ISO 9241-110 have been applied.

Reference:
- ISO 9241-110 (2006). Dialogue principles.

19.3 Completeness and relevance of the user interface

19.3.1 The questions in the user interface are complete and relevant.

Explanatory notes:

- If the request for information is incomplete, additional questions should be asked of the supplier of the information. This takes extra time for both the information supplier and the information processor.
- Superfluous questions cost the information provider avoidable time and can influence the quality of the interpretation of the relevant questions.

Assessment criteria:

- There are no missing questions in the user interface that are relevant for compiling the required output.
- No questions are asked that are not necessary to deliver the required output.

20. Rules

In this chapter, guidelines have been formulated for the following properties:
- Completeness of the set of rules
- Relevance of the rules
- Soundness of the rules
- Availability of the description of the rules
- Clarity of the description of the rules
- Clarity and unambiguity of the description of the rules
- Accuracy and completeness of the implementation of the rules

Explanation
- There are three types of rule:
  - Calculation rules
  - Quality rules
  - Reasoning rules
- Calculation rules are intended to derive new information, such as an invoice amount, interest, amount of a benefit or tax or an estimate (statistical figure).
- Quality rules are intended to enable checks to be carried out on existing data in order to detect errors, e.g. age must be greater than 18 years.
- Reasoning rules control the workflow.

Target:
- Quality of the output.

20.1 Completeness of the set of rules

20.1.1 The set of rules is complete.

Assessment criterion:
- No rules relevant to the quality of the output are missing.

20.2 Relevance of the rules

20.2.1 Every rule is relevant.

Assessment criterion:
- Each rule applied is relevant in view of the quality of the output.

20.3 Soundness of the rules

20.3.1 The rules are sound.

Assessment criteria:
- The rules are consistent with agreements or legislation.
- The rules meet scientific criteria. This applies, for example, to statistical methods.

20.4 Availability of the description of the rules

20.4.1 The description of the rules is available to all concerned.

Assessment criterion:
- All the rules are described.

- The description of the rules is available for each employee or information consumer for whom these rules are relevant.

20.5 Clarity of the description of the rules

20.5.1 The rules are laid down in a clear manner.

Assessment criteria:
- There's a dictionary for rules.
- Rules are described in a limited number of documents.

20.6 Clarity and unambiguity of the description of the rules

20.6.1 Each rule is clearly and unambiguously described.

Assessment criteria:
- Rules can be understood by all concerned.
- Rules are not open to interpretation.
- A rule is only described in one document or system.

20.7 Accuracy and completeness of the description of the rules

20.7.1 Each rule is correctly described.

Assessment criteria:
- Every time there is a change in the regulations, there is a check that the rules are still correct.
- The rules and their description will be adapted at the same time or as soon as possible.
- Version control is applied to the set of rules.
- It is known which version of the set of rules has been applied and when.

20.7.2 Each rule is fully described.

Assessment criterion:
- All relevant data on a rule are described.

20.8 Accuracy and completeness of the implementation of the rules

20.8.1 The rules have been properly implemented.

Assessment criteria:
- The rules are implemented according to the description.
- If rules are applied at multiple points in the process, these rules are the same as each other (consistency).

20.8.2 The rules are fully implemented.

Assessment criterion:
- All the rules described have also been implemented.

Part IV: Input

Part IV describes guidelines for the quality of the following objects:

- Content of the dataset
- Dataset
- Records in a dataset
- Data in a dataset
- Delivery of a dataset
- Supplier reports

This concerns the same objects as the objects on the output side (except for the obvious difference in the last bullet).

This section does not apply if the information processor collects the data itself from individuals or organisations, such as tax returns collected by the tax authorities.

21. Content of the dataset (input)

In this chapter, guidelines have been formulated for the following property:
- Usability (relevance).

Target:
- Quality of the output.

21.1 Usability of the contents of the dataset

21.1.1 The dataset is useable by the information processor.

Assessment criteria:
- The dataset contains the correct type of entities (person, company, address change).
- The dataset contains the correct set of entities (population).
- The dataset contains the correct variables.
- The dataset does not contain more entities and variables than necessary to avoid excess.
- The dataset covers the right period or the right point in time.
- The correct classification system has been applied.

Example:
- The information processor receives a dataset with all changes of address. This also includes mutations that have occurred as a result of municipal reorganisation. However, the information consumer needs relocation information. The dataset is therefore not usable. The content of the dataset is not sufficiently relevant.
- The information processor receives a dataset with interest paid by persons. However, the information consumer needs a dataset with tax deductible interest. The dataset is therefore not usable without additional data. The content is not sufficiently relevant.

22. Dataset (input)

In this chapter, guidelines have been formulated for the following properties:
- Stability.
- Processability.

Target:
- Quality of the output.

22.1 Stability of the dataset

22.1.1 The dataset is sufficiently stable.

Assessment criterion:
- Successive versions of the datasets (provisional and definitive data) do not have too many unexpected differences from one to another.

22.2 Processability of the dataset

22.2.1 The dataset can be processed by the information processor.

Assessment criteria:
- The dataset is in the agreed format.
- The dataset is delivered on/via the agreed medium.

23. Records in a dataset (input)

In this chapter, guidelines have been formulated for the following properties:
- Completeness.
- Connectivity.

Target:
- Quality of the output.

23.1 Completeness of records in a dataset

23.1.1 It is known how many records the dataset should contain.

Assessment criterion:
- It is clear which or how many records should be present in the dataset according to the content of the dataset.

Example:
- The collection of all companies liable for VAT is known.

23.1.2 It is known how many records are actually in the dataset.

Assessment criterion:
- The number of records in the dataset is counted by the supplier and the information processor.

Example:
- A dataset contains VAT data. However, the VAT data of 12,000 companies have not yet been received.

23.2 Linkability of the records in a dataset

Linkability of the records in a dataset depends on the presence of the correct link variables in the dataset (21.1) and the correctness of the (values of the) link variables (24.5).

24. Data in a dataset (input)

In this chapter, guidelines have been formulated for the following properties:
- Completeness.
- Integrity.
- Consistency.
- Plausibility.
- Correctness.
- Format.
- Verifiability.
- Reproducibility.

Target:
- Quality of the output.

Explanation
- Data consists of data in a dataset and the description of content of the dataset. The quality of the description of the content of the dataset is described in chapter 14.

24.1 Completeness of the data in a dataset

24.1.1 The data in the dataset are sufficiently complete.

Explanatory notes:
- Data is not complete if data is missing from the dataset, when values should be present ('missing values').
- This phenomenon also corresponds to item non-response.

Assessment criterion:
- The completeness of the data in the dataset corresponds to agreements with the supplier.

Example:
- In a file of address data the house number is not always entered.

24.2 Integrity of the data in a dataset

24.2.1 The data in a dataset have sufficient integrity.

Explanatory notes:
- A distinction can be made between integrity of one field, between fields of one record, between records, within the dataset and across datasets.

Assessment criteria:
- The integrity of the data has been checked on the basis of rules.

24.3 Consistency of the data in a dataset

24.3.1 The data in a dataset are sufficiently consistent.

Assessment criteria:
- There is consistency with data from the same entity from previous periods. These are not too far apart.
- There is consistency between preliminary and final data. These are not too far apart.
- There is consistency with data from other datasets with the same content.

24.4 Plausibility of the data in a dataset

24.4.1 The data in a dataset is plausible.

Explanatory notes:
- Plausibility is a special form of consistency. This involves comparing data with data that describe related phenomena in reality.

Assessment criteria:
- The data are - if possible - compared to data in other datasets and the differences are credible.

24.5 Correctness of the data in a dataset

24.5.1 The data in a dataset is sufficiently correct.

Explanatory notes:
- The correctness of data can only be established by testing data against reality or on the basis of the assessment of the source (for example, in the case of a basic register system).

Assessment criteria:
- There is a process to check the correctness of data in the dataset. This can also be done on a random basis.
- The data are authentic.

Reference:
- NORA. AP13 Source registrations are leading.

24.6 Format of the data in a dataset

24.6.1 The format of the data in a dataset complies with the agreed standard.

Explanatory notes:
- Personal names and street names can be written in different ways. For example, Apolloln or Apollolaan.

Example:
- The street name is abbreviated to 24 characters according to NEN 5825.

References:
- NEN 1888 (2002). Standard for general personal data.
- NEN 5825 (2002). Standard for address information.

24.7 Verifiability of the data

24.7.1 It is possible to check how the data were created.

Assessment criterion:

- The source material for the data is available for as long as the information processor or other interested party may request the supply of the source material or wants to know how the output was created.

24.8 Reproducibility of the data

24.8.1 The data can be reproduced.

Assessment criteria:

- It is known which version of the input file has been used.
- It is known which version of the software has been used.
- It is known which manual changes have taken place during processing.

25. Delivery of the dataset (input)

In this chapter, guidelines have been formulated for the following properties:
- Timeliness.
- Punctuality.
- Continuity.

Target:
- Timeliness and punctuality of the time of delivery of the output.

25.1 Timeliness of the time of delivery of the dataset

25.1.1 The dataset can be delivered within a reasonable time after the end of the reference period (actual data).

Explanatory notes:
- The reference period is the time period to which the data refer. This can also be a point in time.
- The desired time of delivery can vary from immediately after update to a few months after the end of a calendar year of an annual file.

Assessment criteria:
- The reference time period or point in time is known to the information processor.
- The supplier knows the importance to the information processor of the data being up-to-date.

25.2 Punctuality of the time of delivery of the dataset

25.2.1 The dataset is delivered by the supplier at the agreed time.

Assessment criterion:
- The datasets have been delivered on time for the last 12 months.

25.3 Continuity of supply of the dataset

25.3.1 The continuity of supply of the dataset by the supplier is guaranteed.

Assessment criteria:
- The supplier has implemented processes for incident and calamity management.
- The supplier ensures that changes in the process or system are timely and communicated.
- The supplier has a business continuity plan, including a fall-back scenario in the event of a failure of the IT infrastructure.

26. Supplier reports

In this chapter, guidelines have been formulated for the following properties:
- Availability.
- Correctness and validity.
- Completeness.
- Punctuality of the time of delivery.

Target:
- Quality of the output.

Explanatory notes:
- Reports to the information processor by the suppliers are also called quality reports or 'packing slips'.

26.1 Availability of reports from the supplierss

26.1.1 There are reports from the suppliers.

Explanatory notes:
- There may also be self-evident reports that are not mentioned in the agreements. However, suppliers and information processors may have different views on what constitutes self-evident reporting. In order to avoid conflicts, it is therefore useful to make agreements about information consumer reports.

Assessment criterion:
- The suppliers deliver the agreed reports.

26.2 Correctness and validity of the suppliers' reports

26.2.1 The suppliers' reports are correct and valid.

Assessment criterion:
- The correctness of the content of the reports by the suppliers is checked.

26.3 Completeness of suppliers' reports

26.3.1 The reports contain all agreed information.

Assessment criterion:
- All the information in the agreements regarding reports is also included in the suppliers' reports.

26.4 Punctuality of the time of delivery of reports from suppliers

26.4.1 Suppliers' reports are delivered on time.

Assessment criterion:
- Reports are delivered at the same time as the dataset.

Part V: Supplier

Part V formulates guidelines for the quality of the following objects:

- Relationship and communication with information suppliers
- Agreements with information suppliers
- Measuring system (as supplier of data)

27. Relationship and communication with information suppliers

In this chapter, guidelines have been formulated for the following property:
- Effectiveness.

Target:
- Continuity of the information processing process.

27.1 Effectiveness of the relationship and communication with information suppliers

27.1.1 Communication with information suppliers has been streamlined.

Explanatory notes:
- Suppliers of information may also be individuals or organizations that only provide information about themselves, such as a taxpayer who makes a declaration.
- There may also be several suppliers within one organisation.

Assessment criteria:
- Account management is implemented. This is useful in case of large numbers of suppliers within one organization or large numbers of information processing departments within one organization.
- Account managers have the task of initiating communication between parties and solving any communication problems.
- Suppliers are organized in groups or panels.

27.1.2 There is periodic and structural consultation with the suppliers of information.

Assessment criteria:
- The information processor and the supplier or their representatives meet regularly to evaluate and, if necessary, adjust the agreements.

28. Agreements with information suppliers

In this chapter, guidelines have been formulated for the following properties:
- Existance.
- Timeliness and validity.
- Completeness.
- Clarity and unambiguity.

Target:
- Quality of the input.

Explanatory notes:
- The guidelines for agreements with information suppliers are very similar to the guidelines for agreements with information consumers. This is not illogical, because the supplier is also an information processor.

28.1 Existence of agreements with information suppliers

28.1.1 There are agreements with all the suppliers.

Explanatory notes:
- Some suppliers have already collected information themselves and provided it to Statistics Netherlands (CBS) (e.g. the Employee Insurance Agency (UWV) supplies policy data to the CBS). Bilateral agreements will generally be concluded with these suppliers.
- There are also suppliers (respondents, messengers) who generally provide information about themselves or their opinion. This concerns a larger group of suppliers who provide comparable information. We will refer to them as respondents.

Assessment criteria:
- Agreements have been made with all suppliers and these have been recorded in writing.
- The information processor has made unilateral agreements with respondents by means of general terms and conditions.

28.2 Timeliness and validity of agreements with information suppliers

28.2.1 Agreements with suppliers are current and valid.

Assessment criteria:
- Agreements are signed or confirmed by the supplier and the information processor.
- The validity of the agreements has not expired or the agreements are not older than five years.

28.3 Completeness of agreements with information suppliers

28.3.1 The information products are specified in the agreements.

Assessment criteria:
- The content of the dataset is specified.

28.3.2 The agreements specify the properties of the information that are relevant to the information processor.

Explanatory notes:
- Examples of properties are: consistency of the data, integrity of the data, correctness of the data, linkability of a dataset, stability of a dataset, format of the data, completeness of the data, completeness of the records. See Appendix 3 for the complete list of characteristics and their definitions.

Assessment criteria:
- For each property, the requirements to be met by this property are specified.

28.3.3 The properties of the delivery of the dataset are specified in the agreements.

Explanatory notes:
- This includes the delivery time and an indication of how critical this time is for the information processor.
- Agreements can also be made about the medium through which the information is supplied and the format in which the datasets are supplied.

28.3.4 The medium and format of the dataset are specified in the agreements.

Explanatory notes:
- Examples of media are data communication via Internet, USB stick, CD.
- Examples of formats are ASCII, Access table, XML.

28.3.5 The agreements state which reports are required by the information processor.

Explanatory notes:
- The reports may contain various metadata:
  - Administrative metadata such as the names of the files and the production date.
  - The descriptions of the contents of the datasets such as the names and definitions of the variables (specification) and the period to which the data relate.
  - Process metadata such as checks that have taken place on the data.
  - Quality metadata such as the number of records, a measure of the missing data and the delivery date and time.
- It goes without saying that the quality metadata will be in line with the agreed quality of the data.

28.3.6 The agreements state how the information processor is required to deal with confidential information.

Explanatory notes:
- In the case of personal data, the Personal Data Protection Act applies to the information processor.

28.3.7 The agreements contain a description of how the acceptance of datasets takes place.

Assessment criterion:
- An acceptance procedure has been described. It states which criteria the information processor uses for acceptance and what he does if criteria are not met.

28.3.8 The agreements state how changes, deviations (incidents) and changing requirements of the data processor are handled.

Explanatory notes:
- The changes and deviations that are reported are described. These can be changes in different areas:
  - Administrative metadata
  - Description content datasets
  - Process Metadata
  - Quality of the data
  - Delivery dates
- It is also possible to describe who will be informed of changes, and when.

28.3.9 The contact persons of the information processor and the supplier are noted in the agreements.

Explanatory notes:
- There may be contacts on several levels: strategic, tactical and operational. This applies to both the information consumer and the supplier.
- Contact persons at strategic level approve and sign the agreements.

28.3.10 The agreements state who is responsible for the quality of the data.

Explanatory notes:
- Someone is accountable for the quality of the data.
- This officer is also authorised to take action if the quality of the data is insufficient.
- In principle, this officer could also sign for approval of each delivery.

28.3.11 The agreements state how feedback takes place and about what.

Explanatory notes:
- This mainly concerns feedback from the information processor (in the role of customer) to the supplier.
- Feedback can relate for example to the quality of the product, but also to the quality of the delivery process and the communication by the supplier with the information processor.

28.4 Clarity and unambiguity of agreements with information suppliers

28.4.1 The agreements are sufficiently clear and unambiguous.

Explanatory notes:
- Clarity and unambiguity are especially necessary for the description of the content of the dataset. Otherwise, there may be differences in interpretation between the supplier and the information processor, with possible adverse consequences for the information processor and the user of the information provided by the processor. Recovery actions can in turn have consequences for the information processor and the information consumer of the information processor.

Assessment criterion:
- The agreements have been critically assessed by the supplier and the information processor for clarity and unambiguity.

29. Measuring systems

Sometimes input is provided by measuring systems such as road traffic sensors, other sensors, telephone exchanges, cash registers, ATMs and Internet robots. These systems will then be the supplier of data.

In this chapter, guidelines have been formulated for the following properties of this object:
- Availability
- Reliability

Target:
- Quality of the input.

29.1 Availability of the measuring system

29.1.1 The measuring system is sufficiently available.

Explanatory notes:
- If the measuring system is not available, this may lead to incomplete input. This is the case if the 'transactions' continue to take place, such as the traffic movements that are measured by road traffic sensors.

Assessment criteria:
- It is known when the measuring system was working and when it was not.
- The measuring system is available according to the agreement made.

29.2 Reliability of the measuring system

29.2.1 The measuring system is reliable.

Assessment criteria:
- All transactions are measured. No transaction will be omitted.
- No transactions are recorded that have not occurred in reality.
- The transactions are measured correctly and with sufficient accuracy.

Part VI: Resources

Part VI formulates guidelines for the quality of the following objects:

- Employees/staff.
- Knowledge.
- IT infrastructure
- Information systems.

30. Employees/staff

In this chapter, guidelines have been formulated for the following properties:
- Capacity.
- Competence.

Target:
- Quality of the output.

30.1 Personnel capacity

30.1.1 There is sufficient staff capacity to carry out the process.

Explanatory notes:
- This concerns the entire process from data collection to the delivery of data to information consumers.

Assessment criterion:
- In quantitative terms, there are enough employees to carry out the process within the desired turnaround time.

30.2 Competence of the employees

30.2.1 The group of employees who carry out the process is sufficiently competent.

Assessment criteria:
- Employees are periodically assessed for their competence.
- The competence of employees is kept up to date (e.g. by learning in practice, information meetings, courses, training and seminars).
- Employees are informed about new developments concerning the process and its systems.
- All employees are informed about the agreements that have been made with information consumers of the output.

31. Knowledge

In this chapter, guidelines have been formulated for the following property:
- Availability.

Target:
- Quality of the output.

Explanatory notes:
Different types of knowledge are relevant to information processing processes. It includes knowledge of..:
- The subject matter (knowledge of the phenomenon recorded in data)
- Process
- Content of the datasets
- Operation of the information systems
- Use of the information systems
- Suppliers of data and agreements with these suppliers
- Information consumers of data and the agreements with these information consumers

31.1 Availability of knowledge

31.1.1 The knowledge required to carry out the process is available.

Assessment criteria:
- Knowledge is recorded in writing or available to employees.
- It is clear what knowledge is needed to be able to (continue to) carry out the process.
- This knowledge is kept up to date.

32. IT infrastructure

In this chapter, guidelines have been formulated for the following properties:
- Availability of IT infrastructure
- Continuity of IT infrastructure
- Performance of IT infrastructure

References:
- Cobit.
- ITIL. Information Technology Infrastructure Library (ITIL).

Target:
- Timeliness and punctuality of the time of delivery of the dataset
- Continuity of supply of the dataset

32.1 Availability of the IT infrastructure

32.1.1 The IT infrastructure is sufficiently available.

Explanatory notes:
- The availability of the IT infrastructure is restricted by limited opening hours, maintenance periods and a limited number of workplaces.

Assessment criteria:
- The IT infrastructure is available at times when employees have to work online with information systems.
- The IT infrastructure is available to perform batch jobs at the times when they are scheduled.
- There are agreements with the user organisation regarding the availability of the IT infrastructure.

32.2 Continuity of the IT infrastructure

32.2.1 The continuity of the IT infrastructure is sufficiently guaranteed.

Explanatory notes:
- Continuity is at risk in the event of calamities.
- In case of calamities, the agreed service levels will no longer be met.

Assessment criteria:
- Recovery times in case of calamities have been agreed with the user organization.
- Recovery plans have been implemented.
- There are fall-back facilities available that match the agreed recovery times.

32.3 Performance of the IT infrastructure

32.3.1 The performance of the IT infrastructure is sufficiently high.

Explanatory notes:

- The performance of the IT infrastructure is limited by the limited capacity of the data centre and of the data communication internally and with the outside world.

Assessment criteria:

- There is sufficient processing capacity to ensure timely processing of the information.
- There is sufficient storage capacity to meet the storage needs.

33. Information systems

In this chapter, guidelines have been formulated for the following properties:
- Compliance with information security standards.
- Functionality.
- Adequate database structure.
- Adaptability.

References:
- Cobit.

Target:
- Public confidence in the organisation.
- Quality of the output.

33.1 Conformity of information systems with information security standards

33.1.1 The information systems comply with a standard in the field of information security.

Explanatory notes:
- Information security is about IT availability/continuity, confidentiality/accessibility and integrity. No guidelines are formulated in the Code about these characteristics in order to avoid duplication.

Assessment criteria:
- A standard in the field of information security has been chosen.
- This standard has been implemented and is tested periodically.

References:
- ISO 27001 (2013). Information security management systems.
- ISO 27002 (2013). Code of practice for information security controls.
- BIR (2012). Baseline Informatiebeveiliging Rijsdienst (Baseline Information Security Netherlands Government).

33.2 Functionality of the information systems

33.2.1 The information systems have the right functionality.

Assessment criteria:
- The databases of the information systems have the correct data structure.
- The information systems adequately support the processes.
- The information systems deliver the agreed information to the information consumer.

33.3 Processing speed of the information systems

33.3.1 The information systems process the data quickly enough.

Assessment criteria:
- The processing of the data is fast enough taking into account the amount of data being processed.
- The processing speed of the data is not a bottleneck for the timeliness and punctuality of the time of delivery of the output.

33.4 Adequacy of the database structure of the information systems

33.4.1 The database structure is adequate.

Assessment criteria:
- Data is stored only once. The database is 'normalized'.
- Each field in the database has only one meaning.

33.5 Adaptability of the information systems

33.5.1 Information systems can be adapted relatively easily to user requirements and regulatory changes.

Explanatory notes:
- The adaptability of systems applies in particular to the type of changes that are foreseeable.

Assessment criteria:
- The information systems have a modular structure.
- Standards/guidelines have been and are being applied for the development and adaptation of systems.
- Software is and will be critically assessed for clarity (structure, explanation, technical documentation) during development and adaptation.

Version management

Version history Dutch edition			
Version	**Date**	**Description of the modification**	**Author**
1.3	7 March 2014	Textual adjustments. **Beta version.**	Peter van Nederpelt
2.0	15 October 2014	Version 2015. **Final version.**	Peter van Nederpelt
2.1	1 June 2016	The Code was transferred from NLIQ to Stichting Dama NL on 27/11/2015, because the NLIQ has been dissolved. The content of the Code has remained unchanged. The code is now maintained by the Information Quality Working Group of DAMA NL.	Peter van Nederpelt
2.2	30 August 2016	The e-mail for change proposals has been updated to info@dama-nl.org.	Peter van Nederpelt
2.3	August 31, 2019	Wpb replaced by GDPR. Revise text on ISO 9001.	Peter van Nederpelt
Version history English edition			
Version	**Date**	**Description of the modification**	**Author**
2.4 EN	January 22, 2020	Revision of English translation	Andrew Black

Active distribution per version	
Version	**Distribution**
1.3	www.nliq.nl
2.0	www.nliq.nl
2.1	http://www.dama-nl.org/
2.2	http://www.dama-nl.org/
2.3	http://www.dama-nl.org/
2.4 EN	http://www.dama-nl.org/