



Guidelines for the  
development of  
databases based on  
the *ISONET Manual*

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First edition, 2001

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## 1. Introduction

The *ISONET Manual* was developed for information exchange between different institutes. It is a library of all the different data elements that can be used and gives definitions for the content.

In reality the Manual will also be used for the creation and restructuring of the database itself. The main reason is that the database should be able to produce the *ISONET Manual* exchange format. In theory the content of the database could be very different, but then a costly and time consuming tool has to be developed to convert the data to the Manual format for exchange purposes. Also input or import of data will be very difficult. In practice it is advisable to stay as close as possible to the definitions offered in the *ISONET Manual*.

These guidelines for the development of standards databases are designed for institutes with different levels of organisation and technology. The main advantage of these guidelines is that even a very modest start is future proof. When the institute reaches another level the data can still be used. Never forget: the main investment that should be made is not in the software but in the quality of the data. The database software is not more than a tool to handle the data and to convert the data in useful information.

It is advised to stay as close as possible to the recommended data elements. When there is a good reason to change the definition of a data element it is recommended to create an extra data element only for local use.

The guidelines given in this document concentrate on standards. Some of the standardization institutes also fulfil responsibilities in the field of technical regulations. These guidelines only consider technical regulations where need special attention is needed.

The guidelines can be used for setting up new databases or restructuring existing databases. The framework is a project plan. We have chosen this approach because more and more standardization institutes work with clearly structured projects to set up new activities.

The following are advantages of working with a formal project plan:

- The project has clearly defined starting point and end point.
- It improves communication between involved parties.
- Responsibilities and tasks are divided in a clear way.

Those persons less experienced in project working should ask their management for project management training. Such training should provide:

- the skills to produce project plans for different situations;
- the social skills that are necessary when there are many people involved in the project who have different interests;
- the possibility to exchange views with other participants on problems that they have met in all types of projects and the solutions they found.

When project management training is not possible, there are many good books on project management available.

### Examples of books:

Don Yeates and James Cadle, *Project Management for Information Systems*

Trevor Young, *30 Minutes to plan a project*

(see Annex 4 for further details of these references)

## 2. Steps to be taken before preparing the project plan

### 2.1 Difference between a project database and a product database

The *ISONET Manual*, especially the introduction, should be read in order to understand the difference between a project database and a product database. Be sure to understand the difference between a project database and a product /document database and then try to find out whether it is necessary to develop, or to restructure, both of these databases.

#### 2.1.1 Projects

According to the definition (*ISONET Manual*, clause 1.4) a project is a unique set of coordinated activities, with definite starting and finishing points, undertaken by an individual organisation to meet specific objectives within defined schedule, cost and performance parameters. Normally a project is aimed at producing a new standard or an amendment to a standard. In a project database it should be possible to follow the standard from its birth (the realisation that a standard is needed in a specific field) to its publication. This means that all the different phases are traceable.

The purpose of having a project database is mainly to help manage the process of producing standards: financial implications, committee responsible, target dates, product(s) to be published.

The *ISONET Manual* is structured in such a way that for exchange purposes there will be one record for each project. An institute can have reasons to keep the full history of a project. In these cases, there shall be one record that is representing the actual situation at the current time. This record shall be used for exchange purposes. Other records in the project database should be flagged as historical. Every time a project enters into a new phase, a new record can be created.

#### 2.1.2 Products

According to the definition in the *ISONET Manual* (clause 1.4), a product is a form of work produced as a result of a project. A standard is an example of a product. A draft standard is also an example of a product. These items are called products, and not documents, to indicate that the result of a project is not always a paper document since the result could also be a file or CD-ROM. For one specific product there shall be one record. In the *ISONET Manual*, it is foreseen that there can be records for previous editions. It is recommended to keep a history of standards in the database. Long after standards have been withdrawn there can be reasons to check this information e.g. for legal purposes and in situations where equipment, constructions or services are based on withdrawn standards.

#### 2.1.3 Separate development

The project and standards databases could be developed completely separate. When the two databases both follow closely the *ISONET Manual* it is possible to exchange data between the two databases by file transfer or via an interface. The *ISONET Manual* has anticipated this use by giving the same numbers and definitions to data elements that can be exchanged between a project and a standards database. For example: the data element "Abstract" is in the project table (10.206) and in the product table (20.206).

The file transfer should follow specific procedures. When a project reaches a specific stage and a document is produced, then all data elements that are of interest to the product database should be placed in a file. This file is imported into the product database. When there are differences in definitions between the two databases a conversion is necessary before the data can be imported.

Possible reasons for choosing to develop separate databases are:

- Differences in organisation: the departments that maintain the project and standards databases are organised differently. It could be that project data are maintained directly by the standards-writing division and the maintenance is the responsibility of the technical officers. The product data are

maintained by the publishing department or information centre. The responsibilities are strictly separated.

- The project data are connected to a financial or overall management system and it is thought that this system is not suited for bibliographical data for products.
- Decentralisation: the project data are maintained outside the institute on different locations.
- Communication between different parts of the institute is not optimal.
- There are differences in quality levels between different parts of the organisation.

When the last two reasons occur, file exchange between the two databases will also cause problems. Before loading the data into the product database, the data must be checked and corrected.

#### **2.1.4 Integrated development**

There can be reasons for integration of the project and standards databases. This means that there are not two separate databases, but only one integrated database system for both.

This integration is logical in cases where the decision has been taken to keep the full history of every project. Every time a project reaches a new stage, a new record is added to the database. This means that information on a specific stage is fixed in time and kept in a record that is flagged as historical. In this case, the information on a specific product that is produced in a specific phase is fixed in time.

What does this mean in practice? For a project that has gone through four stages (idea, draft, formal vote, published standard) there will be four records in the integrated database. Three records are connected to phases of specific product developments (draft, formal vote, published standard).

A further solution, half-way between separate development and full integration, is to keep full histories of those records only where a product is produced. In that case there would have been three records for the example.

The records flagged as historical can be kept in the database and can be selected or deselected. It is also possible to create a special database for historical records. This avoids confusion and can improve the performance of the active database. The disadvantage of this solution is that there is no general overview from one source. Statistics and overviews have to be made from two sources (active database and historical database).

The simplest solution is to have only one record or entry for each project in the integrated database. Every time the standard reaches the next phase, the data are updated. No historical data is kept, neither for the project nor for the documents that have been produced. The advantage is that the structure is simpler and is easier to maintain.

Possible reasons for choosing integration are:

- The data for projects and products are maintained by the same division or department.
- The data are maintained by different divisions but there is good communication and agreement on quality levels for both projects and products.
- The institute has a very small number of projects and is mainly publishing standards.

## **2.2 Contact standardization institutes in the region**

Try to find out what can be learned from other institutes in the region. This can also be of importance for future information exchange in the region.

### 2.2.1 Neighbouring countries

Especially those institutes from neighbouring countries with intensive import and export relations are high on the priority list for a visit. The following points should be considered:

- Study first the paper, CD-ROM or Internet version of the catalogue and/or project data of institutes in neighbouring countries. Study their quality, content, update frequency and structure. Make an overview of the price structure of this type of information product. Make a list of differences and similarities. Make a list of aspects that give a good example for your future developments.
- Study some of the standards produced by the neighbouring countries, especially how bibliographic data are used in these standards. Try to find out if there is an exchange mechanism established for new standards according to the *ISONET* rules.
- If possible visit the information centres of one or two institutes in neighbouring countries. Make a study of the procedures to maintain the data and the different forms of output produced by the information systems. Make a study of the software tools used and how the existing databases are structured. Try to find out if there are data available that can be re-used in your own system. For example a translation of the ICS codes in a specific language, translation of descriptors in a specific language. Data on regional standards that can be re-used.
- Try to find out if exchange of data based on the *ISONET Manual* is useful between the institutes.

### 2.2.2 Regional institutes

For member bodies (existing, candidate or interested) of a regional standardization institute, it is important to know what project and product information can be offered by the regional institute. Make a survey of the following elements:

- Data elements that can be offered, their update frequency and whether they are in accordance with the *ISONET Manual*.
- How the data are structured. Look very carefully for the systems used for project numbers and document reference numbers since these may be used to link the national data to the regional data.
- How and when the data are distributed. The medium (diskette, CD-ROM, satellite, paper) and the file format (ASCII file with delimiters, database files, word-processor files, etc.)

Regional institutes often want to receive information from their members. This information could be:

- project information (e.g. to indicate whether the national standards body has started national work on a specific area);
- information on the adoption of regional standards as national standards;
- indications of whether the regional standard was adopted in an identical way;
- details of when a regional standard was adopted;
- details of when it was announced in an official magazine that the regional standard had been adopted as a national standard.

Points of attention:

- Make a list of the documents that contain specifications for ways in which way information should be transferred to the regional institute.
- Look specifically at the so-called key fields. Usually, these are the project numbers and/or reference numbers of the regional institute.

- Try to find out if there are procedures for exchange of information with the other members of the regional institute.

## **2.3 Discussion with staff on basic requirements**

Discuss with a forum of staff members the general requirements for the standards database.

Points of attention:

- Explain the difference between projects and products and try to discover how they work with projects and products in daily practice. Concentrate on data elements, procedures for maintenance of data and the services to be offered by the database rather than the structure of the database.
- Prepare a list of staff members that are affected by database development. These staff members should assist in preparing specifications for parts of the new information system and in testing prototypes. Try to get commitment on specific amounts of time that they can invest in testing.
- It is important to state very clearly to the persons involved that, as users, they are the owners of the system and they should be made to feel responsible for the success of the new information system.

## **2.4 Discussion with responsible management**

Discuss with responsible management the main goals of the project. Try to find out what their expectations are of the project plan. Try to get an indication of the financial and staff resources available and ask for their commitment and support.

Ideally one member of senior management of the institute is formally responsible for the project. This person could be called the "sponsor" because he is responsible for the allocation of resources: staff and financial. Ideally one person is the project leader. The project leader or project coordinator reports to the sponsor.

## **2.5 Copyright**

It is necessary to do some research on copyright protection laws in your country in the field of databases. Establish the protection level offered by the law and what should be stated in contracts you have with users and clients.

# **3. Preparation of the project plan**

In this chapter we give a survey of the different aspects of a project plan for standards databases. Where possible, examples are given.

## **3.1 Introduction**

### **3.1.1 History**

Give an overview of the existing information systems and their main goals. An information system can be a paper card system, a text file or a real database. Indicate which departments/divisions are responsible for which systems. Give the main reason for change.

Examples of these reasons:

- Maintaining a text file for catalogue production is not efficient.
- Staff members want integration of product and project data.
- Regional standardization has other demands.

- The database software in use is out-of-date or no longer supported.

### 3.1.2 Structure and content of the project plan

Outline the scope of the project plan: list the main chapters and their content in one or two lines.

## 3.2 Starting situation

### 3.2.1 Existing situation

Describe in short the information systems that are influenced by this project.

Give for every system state, in a structured way, the necessary information:

- The services produced with help of the information system.
- Those persons responsible for the maintenance of the data and the production of files.
- Quality problems in the past and present.
- Tools used: paper cards, suspension files, databases etc.
- Connections between the different information systems.

### 3.2.2 Reasons for change

State, in full, all the reasons for changing the information systems. Examples of reasons: changes in the organisation; changes in organisations in which you are a member; changes in technology; clients (buyers) have other needs. When there are more information systems involved, give for every system the reasons for change.

### 3.2.3 Starting documentation

#### Documents

Prepare a list of the documents that were used in preparing the project plan.

The following paragraphs concern documents that can be of use:

The first step should be to study the list of references in the *ISONET Manual*. Mark the documents that should be read and check if they are available in your information centre. If not, order them from another institute.

Try to make a list of the documents that give guidelines for the structure and content of the database. They even can give formal minimum requirements, because of membership duties of the institute or other obligations.

When the institute is a WTO TBT Enquiry Point for standards and has accepted the WTO TBT *Code of Good Practice*, one should carefully study the WTO TBT *Agreement on Technical Barriers to Trade* and especially Annex 3, *Code of Good Practice for the Preparation, Adoption and Application of Standards*. The *Code of Good Practice* gives formal requirements on the content and publication of the work programme of standards. The following data elements are required: ICS codes, harmonised stage codes, title, reference numbers of international standards taken as a basis, date for comment. If the institute is also a WTO enquiry point for technical regulations, study the complete content of the WTO agreement.

If you want to use SGML-formatted ISO standards and to load specific parts of the SGML files (scope, title etc.) in your database then check the ISO DTD for SGML files. The DTD will give the structure of the standards in SGML format.

Another important recommendation on the content of standards databases can be found in the document: *Guidelines for the development of WSSN Web sites*. These guidelines take also in account the TBT agreement. For both products (documents) and projects, a list is given of recommended data elements derived from the *ISONET Manual*. When you follow this list, you will certainly fulfil the requirements of the TBT agreement, annex 3. It is advisable to have all these elements in your own database.

Take into account the ITSIG/STADIST specifications for an *ISONET Manual* SGML based exchange format for ISO projects and products. These specifications are now under preparation.

Another document to study is ISO/IEC Guide 21:1999. This guide gives recommendations for the adoption of International Standards as regional or national standards. The codes of equivalence are explained and guidelines are given how to produce this information on title pages and catalogues. ISO/IEC Guide 21:1999 gives also recommendations on the use of national reference numbers in the case of adoption (single line numbering and double line numbering).

It is important to discuss the possible consequences with the department responsible for preparing the standards. ISO/IEC Guide 21:1999 gives recommendations for the adoption of international standards as national standards that influence the production of cover sheets, introductions in standards and catalogues and other bibliographic material. The codes of equivalence (NEQ, MOD, IDT) should be used everywhere in a consistent way. Documentation staff should be able to extract from the document all the information needed on the relationship between national and international standard.

If you want to participate in the bibliographical CD-ROM *Perinorm*, or if you want to establish a *Perinorm* inspired bibliographic service in another region then study the file requirements. The file structure of *Perinorm* is based on the first edition of the *ISONET Manual*. When your own database is in accordance with the new edition of the *ISONET Manual*, a conversion is necessary. This will cost some time, but no real problems are foreseen, because the new edition is more precise than the old edition.

If you are a member of a regional standardization institute prepare a list of documents with requirements for data and/or document exchange. For Europe, refer to the following documents and products:

- CEN: Requirements for the information procedure (exchange of new work items on standards).
- CEN: Study the database formats so as given on the CEN CD-ROM with new documents. There are two database formats: one database file with information on new documents; another data file with the complete CEN work programme.
- CEN: Requirements for data on implementation (ICONE) of European standards on a national level.
- CEN: Requirements for the file on the announcement of European standards by the national member.
- CENELEC: Requirements for a file on national titles of harmonised standards and the adoption of European standards by national committees.
- ETSI: Requirements for file on the implementation of European standards by national standardization institutes.

When there is a quality system in operation it can be important to refer to the documents where the working procedures are described for the preparation of standards and the distribution of information on standards. When working procedures have to be changed or are difficult to understand then contact the person responsible for maintaining the working procedures.

## **Discussions**

Here you can refer to discussions and consultations you had. Try to have a written report or memo of every interview and refer to the document numbers on these reports. When these reports are important or difficult to find, attach these documents as annexes to the project plan.

Possible persons to consult:

- Responsible management.
- Information manager of another standardization institute.
- Key staff members.

### 3.3 Project result

#### 3.3.1 Purpose

This is a short overview of the different purposes of the project. The following points could be included:

- The possibility to offer new services to your clients.
- To improve the quality of existing services.
- That you improve the efficiency of your own organisation.
- That the database technology you use is future proof.

#### 3.3.2 Result

Here you report what future users can expect in their daily practice of the new system. Give practical information that can be measured and tested.

To give some examples:

- The average time to produce a standard will be shortened from 6 months to 4 months.
- The new user interface for the information centre will make it possible that staff members of the information centre can handle more questions a day.
- The quality of the answers given by staff members of the information centre will increase. Therefore we can start charging money for these services.
- With the new system we will be able to produce a file for distribution on CD-ROM.

#### 3.3.3 Quality demands

Give an overview of specific wishes of responsible management in the field of quality.

Examples of these wishes:

- Shorten production time of the paper catalogue to bring it faster to the clients.
- Better quality of the data etc.

#### 3.3.4 Formulation of the task

Formulate here, if possible in one sentence, the task of the project based on section 3.3.2 above.

State how much time is needed after approval of the project plan to finish the project and which senior manager will be responsible for the project. The project leader will report to him on a regular basis. In the case of severe problems the responsible manager has to decide if the project plan has to be changed or even stopped.

When necessary indicate clearly what is **not** the content of the project.

### 3.3.5 Risk assessment

Be honest and clear about possible risks. This is of course for your own safety, but the main reason is that you can indicate how you want to reduce these risks.

Examples:

- The involved staff members have not enough expertise. This risk could be minimised by indicating that an external consultant will assist in the project.
- A complex conversion program has to be written to convert the data from an old system to a new system. This risk could be minimised by stating that it is possible to do this work partly by hand when necessary.
- A high number of external consultants of different firms are involved and problems could be expected for the communication between the different consultants. This risk could be reduced by a weekly meeting of the project leader with all external consultants.

When a certain risk cannot be reduced a discussion with responsible management is necessary before starting the project. When a serious risk cannot be reduced the project should be stopped or reconsidered.

## 3.4 Project phases

### 3.4.1 Introduction

For larger and more complex projects it can be good to split the project into parts. Each part is covered by a group that is led by a group coordinator who reports to the project leader.

For a standards database the parts could be the following:

- Services to be provided by the database.
- Working procedures.
- Technical regulations.
- Structure of the database.
- Database software needed with hardware.
- Financing.
- Creation of a working database application.
- Conversion of existing information systems.

Every subject field should have the following phases.

#### **Definition phase**

During this phase the assignment is studied and a list of proposals is prepared. At the end there is a go or no-go decision. Responsible management decides if they accept what is proposed.

#### **Drafting phase**

The global proposals are transferred to specific specifications.

#### **Preparation phase**

The timetable for the different activities, with indication of who is responsible, is prepared in this phase.

#### **Working-out phase**

The activities that are planned take place.

#### **Evaluation**

All previous phases are evaluated.

### 3.4.2 Services to be provided by the database

Prepare a full list of services to be provided by the system. For example:

- Search and maintenance screens for the different departments and clients.
- Print and paper output: direct catalogue production, paper cards.
- File formats to be produced: catalogue file, cover sheets, CD-ROM production like *Perinorm*, exchange files with regional institutes.
- Web catalogue for customers.

### 3.4.3 Existing working procedures

There are several reasons for giving special attention to the existing working procedures:

- Existing working procedures can directly influence the structure of the database.
- If your institute is working with a formal quality system, the new information system can affect the working procedures.
- The quality of the old existing systems was not good. Bad or non-existing working procedures are seen as the main cause.
- With the new information the flow of documents and/or information changes. In this case it is necessary to give an overview of the new document flow and information flow.

When there is a Quality Manager within the organisation try to get him or her involved.

The following types of procedures can be of interest.

#### **Procedures for maintenance**

Staff responsible, updating frequency.

#### **Procedures for producing output**

For example, the production of a standards catalogue based on data in a text processor can follow specific procedures that can be of interest. Perhaps the file is handled and processed by an outside company. Possible changes should be discussed with this outside company.

#### **Procedures for authorisation to use the data**

In the case of paper cards it can be important to know who is authorised to use the data. This can influence the protection levels for the database that replaces the paper card system. With password protection only a specific set of the staff members have authorisation to access the information.

#### **Differences in procedures**

Often, not all the different departments within a standardization institute have the same procedures. In some cases, one division has a centralised projects database, but another department has no centralised system and it is the responsibility of the technical officers to have an overview on their projects. Try to find what the reasons are for these differences and if there are good reasons to have the same procedure for the whole organisation. If not, the new system should offer some flexibility in maintaining the data. Try to come to a set of minimum requirements for everybody, based on formal requirements for this type of database. For example, the list of data elements given in the WSSN guidelines for websites. If the divisions do not want to, or cannot, co-operate then try to establish procedures to maintain the data in a proper way by another part of your organisation, for example by the staff of the Information Centre.

#### **Procedures are not clear or consistent**

If procedures are not clear or consistent, try to find what the reasons are. Possible reasons could be: change in staff, there is too much work pressure to prepare a good administration system for procedures. When the procedures are important for the quality of the database then first discuss this matter with

responsible management. When procedures are not clear a proper working and up-to-date database will be very difficult to establish. Never believe that a new database is the solution for bad working procedures.

### **3.4.4 Technical regulations**

In cases where the institute is a WTO Enquiry Point for technical regulations it is useful to create a special working group for this aspect. Technical regulations are developed outside the standardization institute and are therefore subject to other working procedures.

The *ISONET Manual* also supports information on regulations.

The following are points of interest:

- The requirements stated in the *Agreement on Technical Barriers to Trade* (Marrakech 1994). The WTO Secretariat offers a lot of extra material. For Europe the so-called "Information Procedure" is important in this field.
- A study has to be made of the national system of legislation and how that influences the construction of the database. It is important that every technical regulation has a unique reference number. This reference number can be used everywhere in the database. Procedures to change regulations by amendments. If necessary try to get assistance of a lawyer with experience in this field.
- Special care has to be given to the relationship between standards and technical regulations. Technical regulations can make a standard mandatory/compulsory, or it can simply be recommended or advised to use a standard.
- When necessary, meetings should be organised with representatives of governmental ministries/departments that are involved. Establish working procedures for the flow of information, from the government to the institute and vice versa. There must be a working procedure for the notification of new technical regulations. There must be a working procedure for handling questions and comments.
- It must be clear if the database will contain all existing technical regulations or only the new ones.

### **3.4.5 Structure of the database**

See previous chapters.

An example of an integrated database (project and product) will be given.

There is a kind of logical development for the structure of the database and its use. This development will not be the same for every standardization institute, but the example will give an idea of the type of development for your own organisation. It is advisable to strictly follow this development and not skip phases. For example, if you go directly from phase 1 to phase 4, you simply miss the expertise to create and to maintain a more complex system.

#### **Phase 1**

- There is a simple database, mainly consisting of one table, for catalogue production. All information products produced with the help of the database are paper based.
- There is a simple database, also consisting of one table, for the projects. This system is only used for internal purposes.
- The structure of the two databases (projects and products) is different and there is no exchange of data.
- The departments that maintain the data have very different working procedures and there is little or no communication.
- There is a sales system, but not connected to the other two systems.

#### **Phase 2**

- There is more advanced data for catalogue production consisting of more tables: a base table with bibliographic data connected to other tables like ICS and TC. Some information products based on the database are electronic (e.g. CD-ROM).
- There is a more advanced database for projects. There are linked tables for projects, TCs, addresses for members of TCs. The projects database is in some way connected to an overall financial system.
- For the common elements, the two databases (projects and products) are structured in the same way and there is data-exchange via an interface. Before the data are imported into the products database there is a check by staff members. There is more communication between the departments who maintain the data and there is agreement on working procedures for the common elements.
- There is a sales system that is connected to the products database.
- The system could be based on relational databases or a mixture of relational databases and more text-oriented databases.

### **Phase 3**

- The project database and the products database are integrated in a single information system. This system could be based on a single database with linked tables. It could be based on two different databases but data are directly transported via interfaces from one system to another without human interference.
- The new information products based on the database are mainly electronically. Existing paper products are still supported.
- This integrated information system for standards and products is aided by interfaces with a sales system or a financial system. Data are transported from one system to another without human interference.
- Normally this system would be based on relational databases.

### **Phase 4**

- The basis of the system is an integrated standards database for projects and products with interfaces to other systems.
- In the database all types of relationships between records are done in a relational way. For example, relationships like 'replaces', 'amends', 'adoption of', 'refers to'. This means that this data can only be entered into the database when this relationship is tested according to the relational logic. It would give the opportunity to produce all kind of value-added services. For example, one standard can easily be checked to see if the references are valid. In the *ISONET Manual* this development is foreseen by the possibility of connecting to every reference an optional pointer to a record identifier.
- The integrated system is connected to an electronic library with all the full-text files of the standards in Word or PDF format.
- The integrated information system is connected to a document flow system for the production of standards.
- Information products are mainly electronic and a combination of factual (bibliographical) data and the full-text files of standards. Paper products are still produced but are decreasing in quantity.

### **Phase 5**

- The integrated standards database is fully integrated with a document flow system.
- The production system for standards is based on SGML. Documents in SGML are produced with the help of the database, SGML documents are also partly sources for the database.

- The system produces automatically information products with all kinds of hyperlinks. Paper is still produced, but only on demand.

### 3.4.6 Database software and hardware requirements

It is important to know if the organisation has already made choices in this area. These choices can be made for the following topics:

#### System software

For the server, a choice can be made from UNIX, Windows NT or another system. The database software should work on the chosen system. Where there is a double systems of servers, for example a combination of UNIX and NT servers, there is more flexibility.

#### Database software

The organisation may have decided to develop all database applications with one type of database software. This introduces a risk to a project in which some specific requirements in the project plan cannot be handled properly by the database package that has been already chosen. This risk is handled in the chapter on risk assessment.

It can also happen that the choice of the package is free, but that there are certain mandatory requirements. Examples of such requirements: the database must support SQL; the database must have a JDBC driver; the database must have facilities for web publishing.

There are two types of databases. First there are the relational databases, abbreviated to RDBMS; for example, Access, Oracle, SQL-server, BASIS, Sybase. These are capable of linking different types of information. For an integrated system for project and product information this type of databases is the most suitable. An RDBMS normally supports SQL to make selections and files. Some of the RDBMS (like BASIS) have good text retrieval possibilities and support the use of a thesaurus (synonym control).

A solution in between is to maintain the data in an RDBMS, but to convert a part of the data on a regular basis to a more text-oriented database package.

When a choice has been made to keep the project database and the product or catalogue database separate, there could be reasons to choose a more text-oriented database for the product database. Examples of these packages: CDS-ISIS of UNESCO, Cardbox. This type of database offers good facilities for text retrieval, often in combination with a thesaurus.

The best way to come to a good choice is to prepare a list of conditions that should be met by the new package. For some of the conditions there could be a weighting factor ("need to have", "nice to have").

These conditions are influenced by the following factors:

- Local support and consultancy offered by different companies. The first choice should be for a database that is currently available in your country or region.
- How many records are expected in total? What will be the file size? How many records will be added or changed daily?
- Based on your research in previous steps: the import and export facilities that are necessary.
- Will it be a standalone application?
- Will it be a networked solution? What is the expected number of staff that must be able to maintain the data and to retrieve the data? What protection levels are needed?
- What is the existing situation in your institute for your computer infrastructure? Hardware (servers, cables, work stations) and software (system software, network software). Is it foreseen that this computer infrastructure will change in the nearby future?
- Can your database be a "flat" table or do you need relational capabilities?

- How much money can you invest in the software and how much money do you have for the yearly licensing fee?
- What is the professional level of the staff of your Information Centre or Computer Centre? What can they develop themselves? What should be done by a consultancy firm?
- Special requirements for your institute (special languages, special characters).
- Is there a wish to integrate an existing archive of electronic documents with the database?
- Is there a wish to publish the data on the Internet? Can this be done by just producing a static HTML file, or must the database be connected directly to the Internet website of your institute and is the information produced dynamically and directly from the database?

### **Other software involved**

It could be a requirement of the new database software that it works closely together with a so called "office package" (text processing, spreadsheet, database). It could be a requirement that the database is connected to an existing document flow system like Livelink or Documentum.

Information systems for products are often linked to a sales system by an interface. The standards database should be able to offer this interface facility.

### **Computer network**

The capacity of the computer network can influence the performance of the database. In cases where the database is connected to the full-text files of the standards, heavy data traffic can be expected. In these cases, the possibility of improving the capacity of the network should be studied.

Where the database is directly linked to a website, the capacity of the Internet connection can also influence the performance of the database.

### **Hardware configuration**

Large investments made in the recent past have left a hardware configuration and there are no resources left for improvement. This involves aspects such as internal memory, hard disk capacity, hard disk access speeds, etc.

## **3.4.7 Financing**

Financing has two aspects: the financing of the project itself and the financial implications of the project when it is finished.

### **Financing of the project**

The following aspects should be dealt with:

- Hours to be invested by own staff.
- Training needed for staff members.
- External consultancy needed.
- Purchase costs for software, hardware and network.

### **Financial implications after project has finished**

This point is often forgotten. There are many points that have financial implications after the project has finished. Some examples are:

- For most database packages there is a yearly maintenance and service fee. This can be between 10% and 15% of the purchase price. Most of the database suppliers charge extra fees for extra modules taken in the future.

- The cost of staff can go up because the database requires highly-skilled IT staff.
- When the database is successful, more staff will use it and the licensing fee will go up.
- A website development based on the database with full-text standards for downloading can mean a high capacity Internet connection with additional costs every year.

### 3.4.8 Creation of working database application

Based on the agreed structure, the agreed services to be provided and the chosen database package, a working application can be developed.

A working application consists of:

- Tables with all the data elements: controls, indexes, relationships.
- Maintenance screens and screens for retrieval.
- Ready-made queries/procedures to produce files and prints.

It is important that there is a special paragraph in the project plan on testing. This paragraph gives details on the following subjects:

- The amount and type of test records to be loaded.
- The type of applications tested and by which type of staff.
- IT staff involved with assisting the testing and the possibilities that they have to change small - or more substantial - things in the database.
- Creation of stable test database and a development database. At the end of the project the development database will become the test database. The stable test database will become the production database. Afterwards every change in the database design must first be made on the test database.

### 3.4.9 Conversion of existing information systems

#### Existing databases or text files

In the case of restructuring an existing database or text files, a profound study has to be made of the content of this database or text file. The following are important elements to study:

- The level to which the existing database follows the *ISONET Manual* format.
- The quality of the data: ensure that data are maintained on a regular basis by trained staff.
- An estimate of what is necessary to convert the data to the new *ISONET Manual* format.

#### Paper files

Part of the information can be stored on paper cards. For example: a paper card for every project, a paper card for every published standard, a card system for the relationships between the different standards.

The points of interest are almost the same as for electronic files:

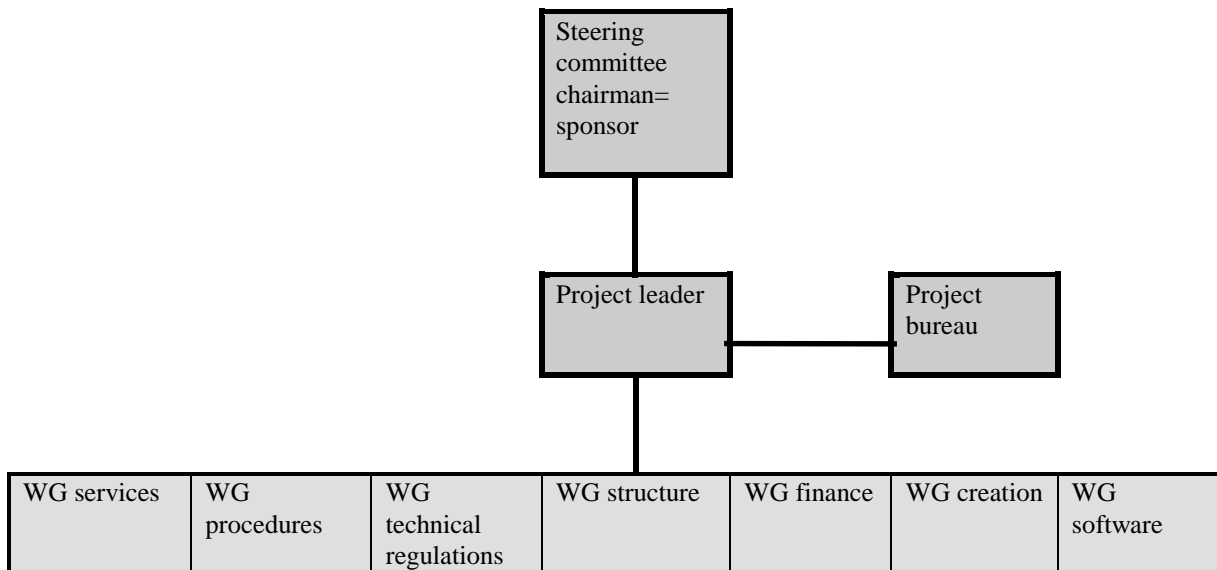
- Study the different elements on the card system.
- Study the quality of the paper cards: maintenance and quality of the staff.
- Study the use of the existing paper files.
- Study the lay-out of the paper cards. It could be that the paper card system should be continued in the future, even with a new database. In this case, the database must be able to produce new paper cards.

In the case of many paper cards, special attention should be given to the possibility of converting the paper cards to an electronic format by an OCR (optical character recognition) process. Specialised companies, as well as some public libraries and university libraries, can assist in this conversion process. Make an estimation of the cost to convert paper files to an electronic format, compare these costs with manually keying-in the data.

### 3.5 Project organisation

Here should be placed an overview of the structure of the project organisation. Indicate who is responsible for what. For complex structures, make an organigram.

The organigram could be as follows:



Other points of concern:

- Cooperation with third parties (for example, government).
- Facilities needed for project staff (housing, offices, computers, meeting rooms, etc.).
- Procedures for establishing a documentation system of the project (central archive or decentralised).

### 3.6 Project planning

This planning should consider the following points:

- Basis for estimations (hours to be spent per week, net time).
- Planning in hours for every activity/subject field.
- Important target dates.
- Financial planning (hourly rates for project staff, money needed for facilities used by the project staff).

### 3.7 End of the project

Prepare full documentation on the system. Ideally the documentation on the system should be prepared in a way that new staff without guidance can understand the working of the system and can support and maintain it. Prepare a final report and present the results to the responsible management. Ask for formal permission to end the project.

Complete documentation on the system should include the following items:

- A list of all tables used with their connections (in the case of a relational database system). If possible refer to the relation with the main tables in the *ISONET Manual*.
- A list of all data elements with their definitions. For each data element the *ISONET Manual* data element should be given where possible.
- A list of all screens with their underlying definitions.
- A list of all output formats with their underlying definitions.
- A list of all protection levels and details of the password system.
- A list of the directory or folder structure with the place of the different files.
- Documentation on procedures for copying the developers database to the production database.
- Documentation on handling database output files outside the database itself.
- Documentation on the import of data from other systems.
- Documentation to support the staff who maintain the data. Instructions on procedures that describe how to enter the data for specific projects or products. Ideally all of these different types of information should be integrated in the help screens provided for the users.

This documentation should be checked by persons not directly involved in the project to ensure that it can be quickly and easy understood.

The end report should then be prepared. This report is prepared for responsible management and should include:

- A list of points that have been accomplished.
- A short survey on the testing results.
- A list of points that could be improved in the future.
- A list of attention points for similar projects in the future.
- A survey of the all the investments made in project: hours spent by staff, money invested.

Responsible management should then formally end the project.

## Annex 1 — Product reference number

The reference numbers of the standards need to be treated with special care. Especially the sorting of standards by reference number is not always so easy. Often there is a lot of history to discover in the structure of reference numbers. Systems with Roman ciphers, classification systems as part of the numbering system, different types of national abbreviations. See ISO/IEC Guide 21 for some guidelines on the numbering of adoptions of International Standards. For these adoptions two solutions are given:

- Dual line numbering: national number and international number.  
Example: NEN-ISO 1234:1996.
- Single line: national abbreviation before international number.  
Example: NEN 9999:1999/ISO 1234:1996.

Single line numbering is the preferred solution given in ISO/IEC Guide 21. From a database point of view the single line numbering is also the preferred option. The database can in this way refer to one single unique reference number.

Normally the product reference number is unique in the database by the combination of number and year of publication. When an institute may produce more than one edition in any one year, the month can be added to the reference. There are institutes (e.g. ETSI) that produce more editions in the same month (Example: ETS 300123:1999-01). The ETSI reference number is made unique by a combination of reference number and edition number (ETS 300123:1999-01 ed 3.2.1).

In a relational database system it is, in theory, possible to use an abstract numeric key generated by the database for linking purposes (instead of the document reference number). For different forms of output the numeric key can be replaced by the document reference number. In this way it is very easy to follow new policies in the use of a reference number.

Study existing catalogues and lists to study how the reference number is used and sorted. Prepare a list of possible problems for which a computer should do the sorting. Try to find out if there are plans to introduce other systems for document references.

There are two ways to sort standards:

1. By splitting the reference number in different data elements. This can only be done if the reference number is logical and consistent in time. The different elements could be: the indication for the document series (ISO, NEN, DIN), the main number (numeric field), sub-number (3) and a sub-sub-number. Be aware that when the main number is a numeric data element in the database, starting zeros can disappear (00123 will change to 123). If a number of amendments are likely, this should be taken into account. By bringing the different elements together, with possible separators as hyphens, the reference number can be reconstructed. A check should be made to prove that the combination of the different elements is unique in the system. A solution in-between: the system produces a proposal, based on the separate elements, for a reference number that can be altered and adjusted in special cases. A sorting key could also be constructed with the help of the different elements.
2. A separate sorting key. When different series of standards are inconsistent, or when the future of the numbering system is uncertain, a separate sorting key data element could be necessary. The information is then somewhat duplicated in the system, but sorting is possible. The sorting key has to be created manually. A solution in-between: a special software tool analyses the reference numbers and proposes a sorting key, that can be adjusted.

Solution 1 should be preferred because it is more efficient, but be very sure that you can produce very easily the complete reference number. Preferably the full reference number is always available in the database and ready for use.

Examples:

NEN-EN 292-2:1995

Splitting in parts could give the following data elements:

- prefix NEN-EN
- main number 292
- part number 2
- year 1995

The sorting key could consist of five elements separated by dots:

001.\*\*\*292.\*\*2.\*\*\*.1995

where:

- the first part, 001, stands for the document series (nat/eur);
- the second part stands for the main number and can have up to 6 positions;
- the third part consists of the part number and can have up to 3 positions;
- the last part is the year of publication.

## Annex 2 — Example standards database

In 1999 and 2000 a standards database was developed for the Uganda National Bureau of Standards (UNBS). This database was based, as far as possible, on the *ISONET Manual*. The database was created in Microsoft ACCESS, edition 1997. The same database can be used with the 2000 edition.

Before starting the database development all working procedures that could influence the database design, maintenance and use were discussed with staff of the standards division of UNBS. Working procedures were especially made for the maintenance of the database. The database will be maintained by staff members of the Standards Division. The information centre will be responsible for adding descriptors to the documents. The full-text files of the national standards, in the form of Microsoft WORD documents, will be given to the Information Centre. The Information Officer will be responsible for the placement of the files on the server and to attach these objects to the database.

A list of data elements in the different tables was created in WORD (see below). These WORD tables give the *ISONET Manual* codes for the data elements. There are also remarks in the table concerning the elements that have repercussions for the database design.

The database was installed on the server. The data objects were placed on the server (back end). The application objects (forms, queries) were installed on the local hard disks. The following three groups of users were created:

- **Administrators:** they have all rights. They have the right to change the structure and to attach WORD documents to the database.
- **Standards:** staff members of the standards division with the right to edit data and to view data.
- **Users:** rest of the staff with only viewing rights.

## Data elements

The following tables list the data elements that are used as input to the process of creating a database application.

### Base table

LABEL	ISONET	Fullname (Caption)	Field properties	Field type	Length	MAND Y/N	Remarks
RecNR	20.001	Record number	-	Autonumber	-	Y	Key field. Record number can be used as project number.
REFN	20.104	Product reference national	-	Text	100	Y	Index. e.g. US 17:1992
SORT	20.500	Sorting key	Input Mask 99.AAAAA.AA	Text	11	Y	Sorting key for every series of national standards. The series number is indicated by the first two positions. 01 could be used for purely national standards 02 could be used for national adoptions of regional standards 03 could be used for adoptions of international standards. This in the case the single line numbering system is used. Example: US 17 is 01.00017.00
TITL	20.200 10.200	Title	-	Memo	-	Y	Title in English. Separate part by space hyphen space
PDAT	20.310	Date of publication	Display format: YYYY-MM-DD	Date field	-	N	YYYY-MM-DD
PRIC	20.226	Price	-	Numeric	-	N	Price in local currency
HS	10.300	Current Stage code	Look-up function based on HarmonisedStage Code table	Text	5	Y	Control table with allowed codes by Harmonized Stage codes
PAGE	20.212	Number of pages	-	numeric	-	N	-
LEGST ATUS	20.618	Legal status	-	Yes/NO data element	-	-	When YES the standard is compulsory by law
LEGA	20.618	Regulations referred to	-	Text	120	N	Any other information on the relationship with technical regulations. For example reference number of National Gazette Example: Uganda Gazette 1998-12-01
ICS1	20.502 10.502	ICS	Look-up function based on ICS table	Text	9	Y	First of maximum 4 codes
ICS2	20.502 10.502	ICS	Look-up function based on ICS table	Text	9	Y	Second of maximum 4 codes
ICS3	20.502 10.502	ICS	Look-up function based on ICS table	Text	9	Y	Third of maximum 4 codes
ICS4	20.502 10.502	ICS	Look-up function based on ICS table	Text	9	Y	Fourth of maximum 4 codes
RELAI	20.612 10.612	Corresponding documents (int)	-	Text	120	N	Reference number International standards with code of equivalence (Guide 21). Example: ISO 1234:1991,IDT. When more separate with (*)
RELAR	20.612 10.612	Corresponding documents (regional and foreign)	-	Text	120	N	Reference number regional standards with code of equivalence (Guide 21). Example: EAS 1234:1991,IDT. When more separate with (*). There could be reasons in the future to split this data element and have separate entries for regional relation and foreign relation.
REPL	20.610	Replaces (product)	-	Text	120	N	Reference number of replaces documents. When more separate with (*)

LABEL	ISONET	Fullname (Caption)	Field properties	Field type	Length	MAND Y/N	Remarks
CDAT	20.306	Latest date for comment	Display format: YYYY-MM-YY	Date	-	N	Must be at least 60 days.
SCOP	20.206 10.206	Abstract	-	Memo	-	N	Abstract based on scope of standard in English
REPB	20.606	Replaced by	-	Text	120	N	Reference number(s) of new standards. When more separate with (*) or the phrase 'withdrawn'.
AMB	20.110	Amended by	-	Text	120	N	When more separate with (*)
AMT	20.108	Amendment type	-	Text	3	N	ADD=Addendum AMD=Amendment COR=Correction Sheet SUP=Supplement
AMDS	20.112	Amends	-	Text	120	N	When more separate with (*)
TC	20.204	Technical Committe	Look-up function based on TC table	Text	20	Y	TC 2
ED	20.220	Edition	Look-up function based on existing system (first, second etc.)	Text	-	N	-
MED	20.232	Medium	Validation: "C" or "D" Display format: >@ (change to uppercase)	Text	3	N	D=floppy disk C=CD-ROM H=Hard Copy
EF	20.238	Electronic format	Validation: "doc" or "pdf" or "zip" or "htm" Display format: >l (change to lowercase)	Text	5	N	Word=doc Pdf=pdf Zip=zip HTML=htm
OLE	20.910	Full text file name	-	Object link	-	N	Link to full text file as placed on the server. File should be read only
ROOT	20.506	Root descriptors	Look-up function based on RootLink table	Text	80	Y	Controlled by a table with all existing descriptors (12,000). For the moment information will attach descriptors to standards in a special form in ACCESS (LinkRoot)
WDATE	20.330	Withdrawal date	Display format: YYYY-MM-DD	Date	-	N	Mandatory for withdrawn standards
TDATE	10.322	Target date of official publication	Display format: YYYY-MM-DD	Date	-	N	YYYY-MM-DD
TPRO	10.408	Type of Project	Look-up function based on TPRO table	Text	15	Y	New, Revision, Amendment, Supplement, Corrigendum

## TC

LABEL	ISONET	Fullname	Field type	Length	MAND Y/N	Remarks
RECID	-	Record number	Autonumber	-	Y	Key field
TC	40.104	Committee identifier	Text	20	Y	TC 1
TCNAME	40.130	Committee name	Text	200	Y	-
Scope	40.170	Committee scope	Memo	-	N	-

## Address

LABEL	ISONET	Fullname	Field type	Length	MAND Y/N	Remarks
RECID	-	Record number	Autonumber	-	Y	Key Field
LastName	-	Surname	Text	50	Y	Full family name
FirstName	-	Firstname	Text	25	Y	Full first name
Title	-	Title	Text	50	N	Job title. Example: Head technical operations
Pcode	-	Postal Code	Text	25	Y	e.g. P.O. Box 3444
City	-	City/Town. Look-up table	Text	50	Y	e.g. KAMPALA, JINJA
PAdd	-	Physical address	Text	100	N	Street address
Icom	-	Institution name	Text	100	Y	The institution or company represented by the member
Email	-	Email	Text	50	N	-
Phone	-	Telephone number	Text	100	N	Separate more than one number with commas
Fax	-	Fax number	Text	100	N	Separate more than one number with commas
Comm	-	Comments	Memo	-	-	Enter an appropriate remark e.g. member out of the country for one year
Country	-	Country in Capitals	Text	100	N	Not to be used at the moment for national standards. Look-up table for future use.
TitleOfCourtesy	-	Look-up facility	Text	50	N	Controlled by lookup table Proposal: Mr, Mrs and Ms. Could also be academic title as Dr

## Role (to be attached to form for Addresses)

LABEL	ISONET	Fullname	Field properties	Field type	Length	MAND Y/N	Remarks
RecID	-	RecID	Key	Autonumber	-	Y	-
TC	-	Technical Committee	Look-up in Table TC	Text	20	Y	-
AddRECID	-	Record number of address	Relation with table Address	Number	-	Y	-
ROLE	40.180 40.185	Role	Look-up table based on table RoleCode	Text	20	Y	C=chairman, M=member, T=technical officer

## ICS

LABEL	ISONET	Fullname	Field type	Length	MAND Y/N	Remarks
ICS	50.001	ICS notation	Text	9	Y	Key field
ICSN	50.110	ICS FGS name	Text	200	Y	-
ICSSN	50.120	ICS Scope note	Text	200	N	-

## HarmonisedStageCode

LABEL	ISONET	Fullname	Field type	Length	MAND Y/N	Remarks
HSC	30.100	Stage code identifier	Text	5	Y	Key field
HSCN	30.110	Stage code name	Text	200	Y	Codes are based on ISO Guide 69:1999 00.20=within standards division 00.60=approved by MT 20.20=drafting 30.00=discussion within TC 40.00=public comments 50.00=TC discussion of public comments 55.00=approval by Council 60.00= publication 80.00=ministry for legalstatus

## Root

LABEL	ISONET	Fullname	Field type	Length	MAND Y/N	Remarks
ROOTI	70.001	Root identifier	Text	20	N	Classification code. When no classification code entered, it will mean that it is not an official root descriptor.
ROOTN	70.105	Root name	Text	100	Y	Key field

## Rootlink

LABEL	ISONET	Fullname	Field type	Length	MAND Y/N	Remarks
RecID	-	RecID	Autonumber	-	Y	-
ROOTN	70.105	Root name	Text	100	Y	Linked to table Root
RecNr	-	RecNr	Number	-	Y	Link to Base table

## TypeOfProject

LABEL	ISONET	Fullname (Caption)	Field properties	Field type	Length	MAND Y/N	Remarks
TPRO	10.408	Type of project	linked to table Base data element TPRO	Text	25	Y	Values: New, Revision, Amendment, Supplement, Corrigendum

## Town

LABEL	ISONET	Fullname (Caption)	Field properties	Field type	Length	MAND Y/N	Remarks
TOWN	-	Name of town/city	-	Text	50	Y	In Capitals
RecNo	-	RecNo	-	Autonumber ring	-	Y	-

## Annex 3 — Sales system

Many standardisation institutes have separate sales systems. Normally the sales system contains information on:

- suppliers of documents;
- all the clients who buy documents or related services;
- the documents and related services that are available for sale;
- subscription services (ICS subscription services, subscription on documents, etc.).

Normally a sales system can provide an overview of all the documents and services purchased by every client.

The sales system can be constructed in different ways.

### **A: Part of an overall financial system**

The sales system is a subsystem of an overall financial system. This system handles all financial matters of the institute (projects, salaries, building etc.). In this case an interface could be constructed that transfers data from the products/projects database to the financial system.

### **B: Separate system**

The sales system is specially developed to support the sales of documents and related services. In this case an interface could be developed to transfer information to an overall financial system. Another interface could transfer data from a product/project database to the sales system. This is only for a part of the bibliographic data elements that are available. Only data elements that are needed will be transferred: document number, short title, pages, committee number. In the sales system other information will be added: price, weight, copies in stock, etc.

### **C: Integration of sales and product systems**

Because the product databases and the sales system partly share the same data elements more integration could give a more efficient system. The sales system will then contain all the necessary data elements of the *ISONET Manual* and the extra elements necessary for the sales system and an interface between sales and product systems is not necessary. The integrated system will be more complex: more data elements, different forms of output, different screens. Normally the project database will not be part of an integrated system. An interface could be made for transferring data from the project database to the integrated sales system. In cases where a choice has been made for integration, a study of the organisation of the institute must be made: this should include close examination of the existing cooperation between bibliographic skilled staff and the sales staff. The new integrated system could influence this cooperation.

## Annex 4 — References

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*WTO TBT Code of Good Practice for the Preparation, Adoption and Application of Standards*  
(<http://www.wto.org/wto/legal/finalact.htm>)

\* Further details of these publications are given in the ISO Online catalogue