



EU Twinning Project

IS12/ENP-APFI/o8

**Support to the Israeli Central Bureau of Statistics
in the development of National Accounts, Education Statistics,
Survey Methodology, ICBS Website and
Coordination of Israel National Statistical System**

Component E

Dissemination and Website

Activity E4.1

**Building Metadata Systems –
Necessary Milestones for a Working Plan**

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24 – 26 February 2014

DRAFT 1



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List of Abbreviations

| | |
|-----------|--|
| NSI | National Statistics Institute |
| ICBS | Israeli Central Bureau of Statistics |
| CoP | European Statistics Code of Practice |
| QAF | Quality Assurance Framework |
| GSBPM | Generic Statistics Business Process Model |
| GSIM | Generic Statistical Information Model |
| QAF | European Statistics Quality Assurance Framework |
| DDI | Data Documentation Initiative |
| SDMX | Statistical Data and Metadata eXchange |
| SIMS | Single Metadata Structure |
| SMU | Subject Matter Unit |
| ESMS | European SDMX metadata structure |
| ESQRSESS | Standard Quality Report Structure |
| Colectica | Standard metadata management tool for the DDI standard |

1. General comments

This mission report was prepared within the EU Twinning Project between the Israeli Central Bureau of Statistics and Statistics Denmark. The mission was placed as a sub-component of Component E, Dissemination and Website.

The objectives of the mission were:

- to introduce ICBS staff to the methodology of building a metadata system; *and*
- together with the ICBS to define a work plan/milestones for the development of a metadata system for ICBS.

The recommendations in this report on how to organize the metadata work as part of the dissemination strategy of the ICBS was the expected output of the mission.

The MS Expert would like to express his thanks to all officials and individuals met for the kind support and inspiring discussions during the stay in Israel which highly facilitated the work.

The views and observations stated in this report are those of the MS Expert, and do not necessarily correspond to the views of the European Union or Statistics Denmark.

2. Methodology for the analysis at the mission

The overall approach is Business Process Management focusing on the “as-is” and “to-be” states.

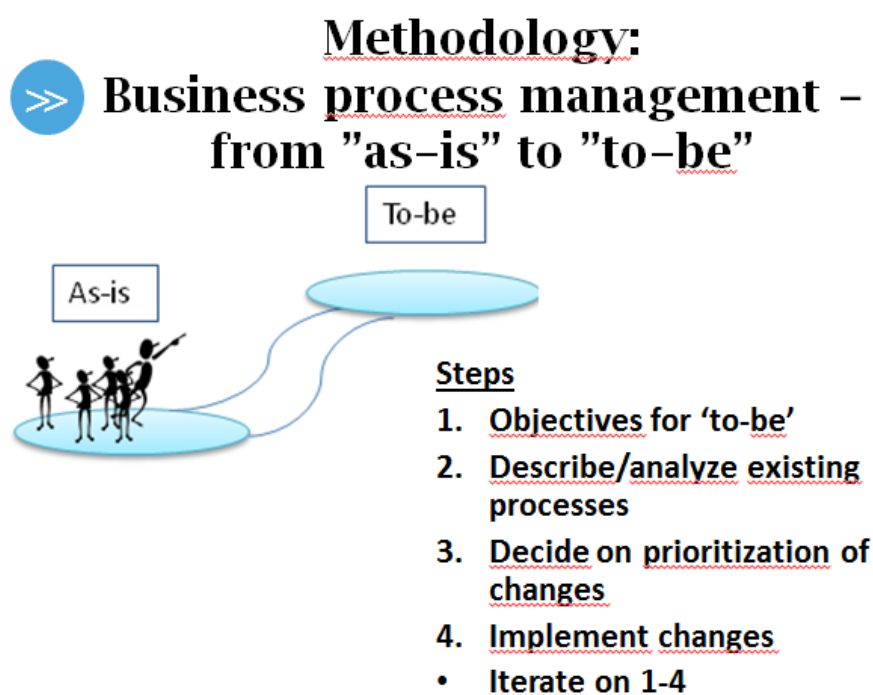


Figure 1. Methodology: Business Process Management

The business process perspective implies that focus is on end-to-end processes, following the ideas on theory on the value-chain. **Each sub-process must contribute to the value of the product delivered to the user/customer.** The production-processes, including processes on metadata, must be designed to fulfil goals for the organisation – including goals on cost-effectiveness.



Business process perspective.

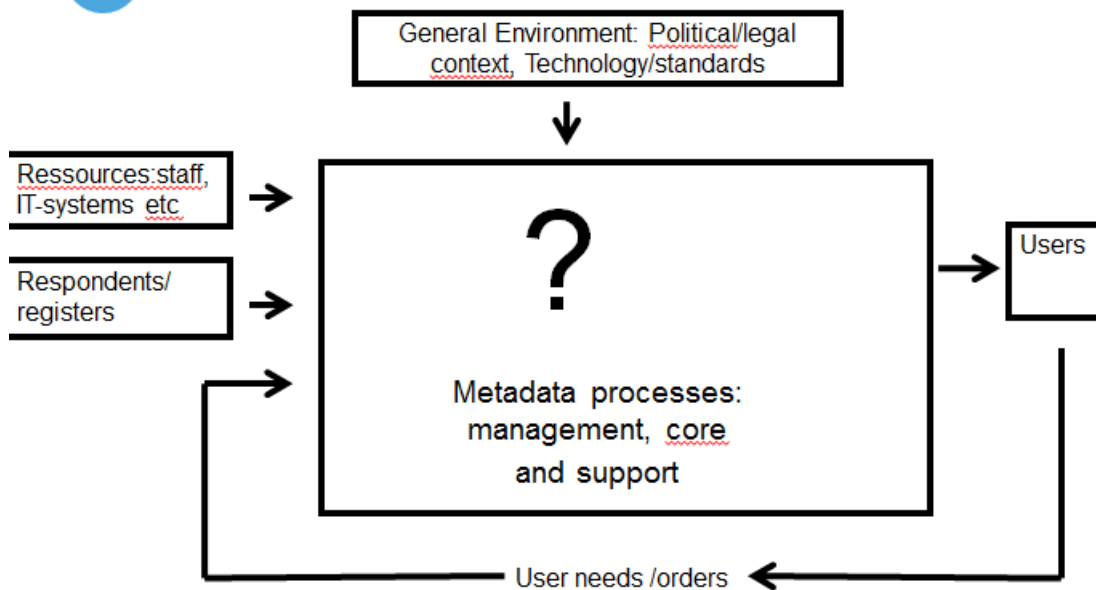


Figure 2. Business process perspective with environment elements.

Figure 3 below depicts the three elements in the analysis undertaken during the mission.



3 main elements in the analysis

A: The situation today "as-is"

- **Environment**
 - 1: Government/ regulations etc
 - 2: Technology
 - 3: User needs
 - 4: Standards
- **Status / ongoing activities**
 - Strategic, business processes and technological



B: Objectives / results "to-be"

General:

1) Cost-efficient production using common metadata 2) Quality of statistical products 3) Fulfillment of user needs on documentation

Functions:

1) User needs and feedback 2) Dissemination of metadata on website 3) Quality Declarations d) common concepts etc 4) GSBPM

C: How to get from A to B

Issues and recommendations

Figure 3. The main elements in the analysis. Note that the text in grey has been inserted based on conclusion during the mission.

3. The situation today and recommendations

The situation on metadata was presented and discussed with ICBS. A number of issues at different levels were raised during the discussion. The recommendations were discussed during the meeting. They are reflected in the suggested work plan later in the report.

Issues and recommendations at the strategic level

1. Awareness and commitment from top level management is needed.
2. Metadata initiatives are not connected to General Strategy of ICBS or the Dissemination Strategy of ICBS.

Recommendations:

- Integrate metadata in the ICBS strategy
- Employ a business process model perspective
- Initiate metadata project. Projects on quality, processes and part of dissemination could be integrated

Issues and recommendations related to end users

1. Statistical illiteracy
2. Difficult to know what data to use
3. Cost-effective transmission of data to international organisations (webservice and sdmx format)
4. Metadata on web-site incomplete.

Recommendations:

- Analysis of known (already identified) problems on dissemination (FAQ, typical problem types, e.g. which variables/statistics should be used to shed light on the problems which the user needs to solve)
- Establish so-called focus groups discussing the roles of metadata.

Issues and recommendations at process level

1. Metadata is time consuming for subject matter units – “steals time from work on statistics”
2. Lack of systematic planning/methodology.
3. Lack of management of processes,
4. Lack of integration between processes, e.g. dissemination, researchers. Guidelines, common integrated metadata
5. Metadata are not integrated with work processes (GSBPM)
6. How should Subject Matter Units be supported using GSBPM and overall framework?
7. Extract Transform Load (ETL) has been introduced but difficult to introduce common standards/models to subject-matter statisticians.

Recommendations:

- Give general information on benefits etc., awareness of the importance of integration, etc., to all staff
- Implement GSBPM (includes translation and adaptation of descriptions to ICBS).
- Include requirements regarding metadata and requirements on changing of processes stemming from the on-going work on the new website e.g. users need more general information about quality. This should be reflected in requirements to common metadata and in requirements on the content of working processes to those producing the metadata.
- Prepare documentation to support management, using simple templates. The purpose of the work on documentation is important to communicate as part of the project. It can be knowledge management, getting knowledge on the use of IT etc.
- Documentation of selected surveys (e.g. between 5 and 10 surveys).

Issues on standards and technical implementation

1. Lack of knowledge on standards
2. Lack of harmonization of standards and metadata across departments
3. Challenges on how to handle new website technology
4. Lack of common transition procedures from paper to web
5. How does CBS standards (parent variables, dictionaries, de facto metadata) play together with DDI, SDMX and international standards in general
6. Micro vs. Macro. DDI and SDMX uses different approaches – how to reconcile?
7. Where to use DDI and where to use SDMX?

Recommendations:

- Training, communication of purpose. e.g. terminology on metadata: DDI, SDMX, GSBPM, GSIM etc.
- Harmonization; use SDMX and DDI. Integrate work between Dissemination Unit and subject matter units
 - Concepts, e.g. Statistical Yearbook (Statistical Abstract) and Subject Matter Units domains
 - Code lists
- Continue work on common variables and code-lists with a view to moving towards sdmx and DDI standards
- Implement standard DDI and SDMX-tools in order to be cost-effective and to ensure the use of international standards.

4. Recommendations on a roadmap for the strategies on processes, quality, dissemination and metadata

Metadata is connected to all processes, including data used and produced. Metadata are closely connected to work on quality and processes. This was acknowledged at the mission. It is recommended to see processes, quality and metadata seen as a whole. Furthermore the functions of metadata should have the business process perspective – how to create a value chain that optimizes the value for users and at the same time creates a cost-effective production process.

The diagram gives an overall picture for the roadmap on how to integrate strategies. It is based on “Enterprise Architecture as Strategy”, by Ross et al¹.

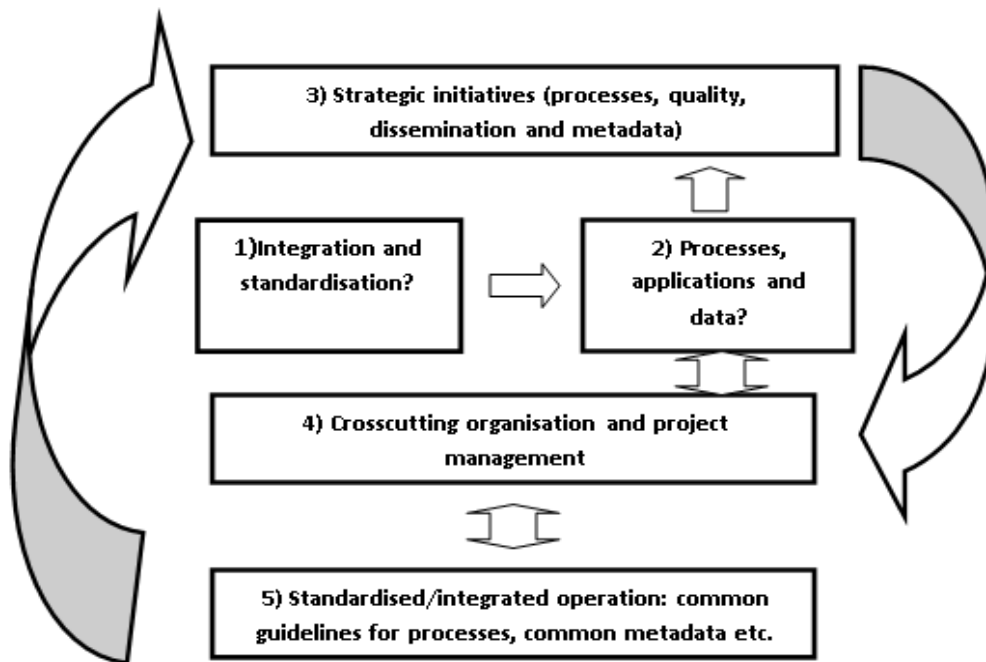


Figure 4. *Strategy model*

In contrast to a traditional strategy approach it is recommended to start with decisions on how to handle integration using common data and common applications (*step 1*). Hereafter general decisions on processes, applications and data should be taken, i.e. enterprise architecture (*step 2*). This step should include decisions on how to describe the existing processes (the *as-is* situation). Having taken decisions on this, ICBS should choose a number of strategy initiatives (*step 3*). Then, a project for each project is established (*step 4*). The last step is the actual implementation of the projects (*step 5*).

Step 1 Decide on integration of data and standardisation of work-processes

On integration of data it is recommended to decide on building a common metadatabase to be used across the organisation and to move towards common statistical databases. The building and decision on the content of statistical databases should be based on the fulfilment of external and internal user-needs. Regarding data this step should only include overall decisions as to what extent ICBS will move towards common databases that can be used by different processes in ICBS. An example: Statistics Denmark are moving towards more integrated data on social statistics, so different registers can be combined.

¹ Ross, Jeanne, Weill, Peter & David C. Robertson (2006). *Enterprise Architecture as Strategy. Creating a Foundation for Business Execution*. Harvard Business School Press, Boston Massachusetts.

On standardisation is it recommended to implement GSBPM, as described below. This task involves a "formal" adoption of GSBPM (including guidelines for processes) and introduction of simple templates for documentation of processes.

Step 2: Decide work processes, applications and data

The diagram below shows business processes, applications, data and metadata in an integrated enterprise architecture model.

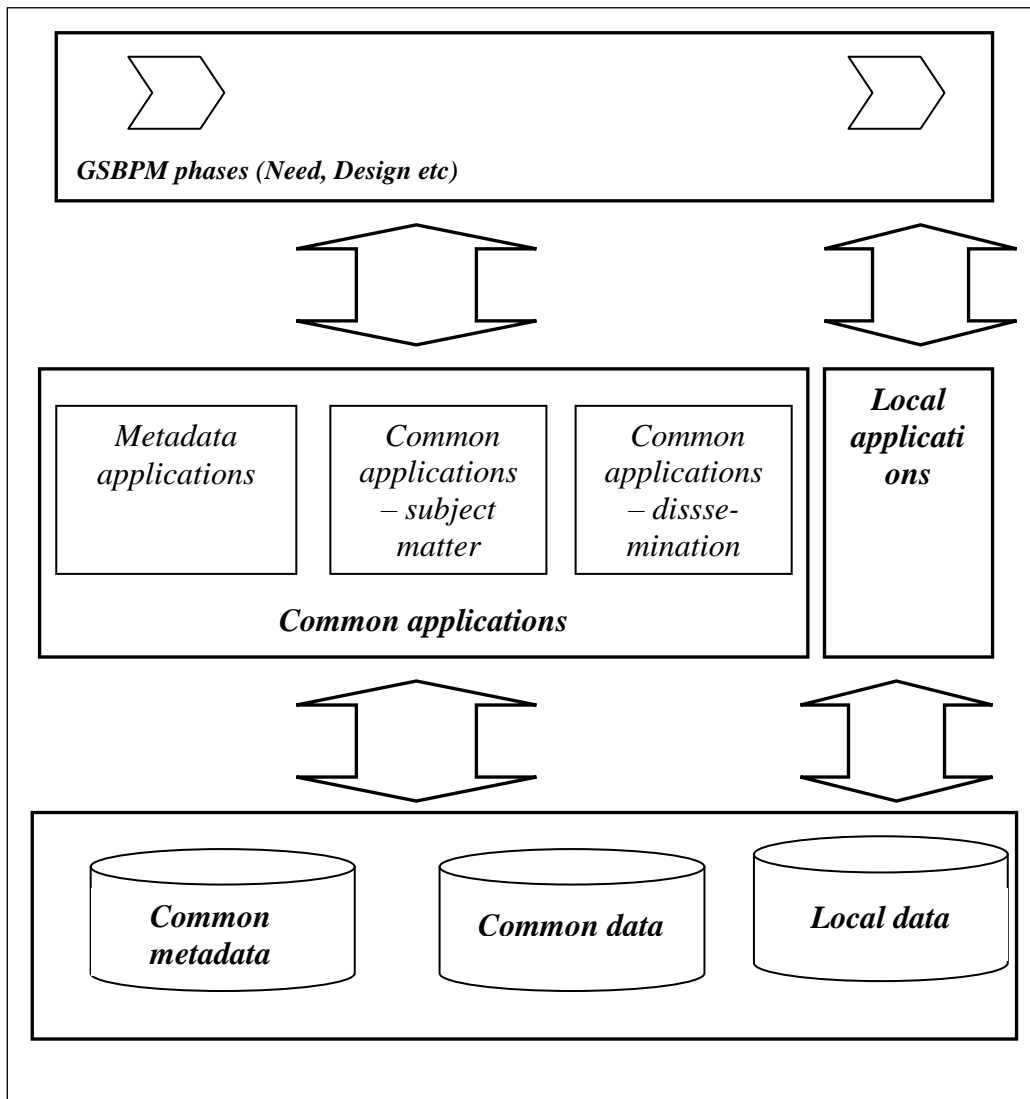


Figure 5. Enterprise architecture model

The idea behind this step (and behind enterprise architecture thinking) is to decide on how to move from "stove pipes" to common processes, common metadata applications, common subject matter applications and common dissemination applications where data and applications can be reused across the organisation.

Does this mean that the entire NSI must be mapped by processes, processes classified, common processes identified and developed replacing existing (stove pipe) processes? The answer might be

yes in the long run. In the short run the answer is no. Existing work-processes and IT-systems and new ideas must co-exist. One should therefore be careful when choosing areas to be improved. It is of course a good idea to have long-run visions on business processes following GSBPM and overall IT-architecture supporting the business processes.

It is recommended to decide on manageable steps forward (see figure 1) based on the decision in step 1. One way forward would be to build a common meta-database including changes in related work processes. Prior to a final decision on this it is recommended to describe existing work processes and systems related to metadata. This includes both common and not common processes. At an overall level this could be done by documenting existing processes on selected surveys for data collection, processing, analysis and dissemination using a simple template with the following items: a) description; b) input; c) output; e) who is doing what; f) tools; g) guidelines. The description should include a short introductory text followed by a description on which metadata is used and produced. Another initiative could be standardisation of work-processes where the same model could be applied.

The „to-be” state on work-processes, applications and data should then be decided based on decisions from step 1 and „as-is” documentation.

Note that both IT and subject-matter staff must be involved in the discussion on which processes to change and how they should be supported by IT. This especially includes decisions on moving towards common data and common metadata. In many NSIs there are a lot of stove-pipe production, and it is important to justify and communicate the benefits on moving towards less stove-pipes.

Step 3: Decide on strategy initiatives

In this step, ICBS should decide on strategical initiatives based on the decisions from step 1 and step 2. During the mission, functions on metadata was decided. These functions are related to strategies on dissemination and quality. See full table on page 12 (*Function and tasks*).

Step 4: Build project organisation and plan implementation of strategy initiatives

ICBS should aim for a common model in terms of project management. A project should be established for each initiative. In addition, a common BPM-group should be established.

Step 5: Implement strategical decisions

In this step, the initiatives are implemented as separate projects.

5 Overall recommendations on metadata

Note that the recommendations below should be adjusted if it is decided to have common activities on quality, metadata and dissemination.

The recommendations below are mainly focusing on how to establish a metadata-system including metadata about quality. A broader perspective on quality would require analysis and decisions on how to implement full quality assurance frameworks including how to monitor product and

process quality. Many EU countries are implementing Quality Assurance Framework included in the overall TQM-frameworks, like ISO or EFQM.

Definition of metadata system

It is important for ICBS to have a common understanding of what a metadata system is. The MS Expert suggests the following overall definition from UN: *A metadata system is a data processing system using, storing and producing statistical metadata. The term system refers to the people, processes and technology involved in managing statistical metadata.*

Statistical metadata can be defined broadly as comprising all information objects in GSIM. Another general used way of defining metadata is to distinguish between reference metadata and structural metadata. This definition can be found in the SDMX Metadata Common Vocabulary (MCV):

Structural metadata: *“Structural metadata are metadata that act as identifiers and descriptors of the data. Structural metadata are needed to identify, use, and process data matrixes and data cubes, e.g. names of columns or dimensions of statistical cubes. Structural metadata must be associated with the statistical data, otherwise it becomes impossible to identify, retrieve and navigate the data.”*

Reference metadata: *“Metadata describing the contents and the quality of the statistical data.”*

Reference metadata includes:

- **Conceptual metadata:** *“Metadata describing the concepts used and their practical implementation, allowing users to understand what the statistics are measuring and, thus, their fitness for use”*
- **Methodological and processing metadata:** *“Metadata describing methods used for the generation of the data (e.g. sampling, collection methods, editing processes)”*
- **Quality metadata:** *“Metadata describing the different quality dimensions of the resulting statistics (e.g. timeliness, accuracy)”*

It is recommended to start with the following 4 elements, named *classical metadata* during the mission: a) Quality metadata and related methodological and processing metadata; b) Conceptual metadata; c) Classifications and code list; and d) Variables and dataset. Note that this is mix of reference and structural metadata.

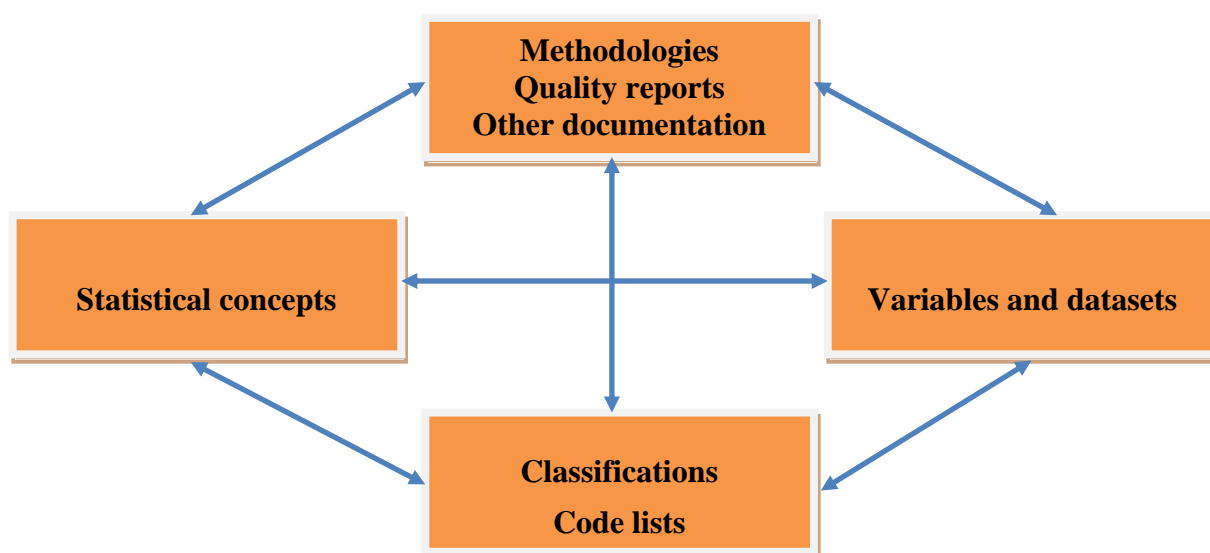


Figure 6. Model showing integrated classical metadata

Objectives on common metadata

It is crucially important that the purpose of metadata, and therefore the purpose of a metadata project, is well-defined. The MS Expert recommends that three overall purposes are declared as the ultimate goals of the project, and that these three goals are analyzed in a report to the top level management:

- Cost-efficient production of statistics
- Quality of statistical products
- Fulfillment of user needs on documentation

Functions and tasks

Based on so-called functions of metadata², five such functions (or goals) were chosen as a result of a group discussion as the primary ones for ICBS. The chosen functions were the basis for a draft work-plan which was discussed during the last session of the mission, and, as a rough draft, agreed upon.

| Functions | Tasks |
|--|---|
| 1. User needs and feedback | <ol style="list-style-type: none"> 1. Analysis of known problems (FAQ, typical problem types, e.g. what variables to use) 2. Focus groups discussing the roles of metadata |
| 2. Dissemination of statistical information (website) | <p><i>Define how metadata can support the information on the website</i></p> <ol style="list-style-type: none"> 1. Design issues (user-friendliness) 2. Integration with StatBank and other dissemination products |
| 3. Improving the quality of statistical data and transparency of methodologies | <p><i>Implementation of Quality Declarations</i></p> <ol style="list-style-type: none"> 1. Definition of quality concept classification ..g. SDDS+ with additional elements in order to fulfill user needs. Another quality concept classification is the Single Integrated Metadata Structure (SIMS) developed by Eurostat 2. Decide on IT software on background of needs analysis, decision of standards |
| 4. Methodological activities | <ol style="list-style-type: none"> 1. Documentation, standardization and harmonization of common concepts, classifications, code-lists 2. Enter the common elements (concepts etc.) into IT solution |
| 5. GSBPM: Planning, implementation, evaluation and documentation of statistical processes + guidelines | <ol style="list-style-type: none"> 1. Adoption of GSBPM 2. Development of guidelines 3. Documentation of existing processes using a simple template based on GSBPM 4. Development of guidelines on the use and production of metadata in the production processes 5. On all future surveys, guidelines are followed and common elements (from IT solution) are used |

² [Common Metadata Framework Part A Statistical Metadata in a Corporate Context](#), UN

Organisation

A project organization involving all relevant stakeholders in the metadata project should be established. The MS Expert suggests that the following structure could be useful:

Steering Committee (Heads of Departments, IT, Methodology, SMU)

Project Group (Methodology, Dissemination, IT, SMU)

User Group (Methodology, IT, Dissemination, SMU)

Short description of the role of each of the groups:

The steering committee should approve the overall project and be responsible for decisions on resources, handling of risks and detailed plans. The project group is responsible for the day-to-day work. The user group should play an important role in order to get feedback. A bi-weekly meeting on status and issues could provide this feedback.

Work-plan

The tasks of the work-plan below refer to the functions that were chosen during the last meeting of the mission, and it contains deliverables from the project which, in effect, are also the benchmarks for the project.

It should be noted that the suggested start and end times are merely indicative and therefore highly unsecure, and that a proper analysis and planning of this should be undertaken. Still, the suggested start and end times are indicative for the suggested sequencing of the different tasks.

Work-plan including indicative time-table

| Task | | Function | Start (month) | End (month) | Deliverables | Responsible and others involved |
|-------|--|--|------------------|----------------|---|-------------------------------------|
| 0.1 | Development of metadata strategy and project priorities | <i>Project preparations</i> | -3 | -1 | Strategy paper on metadata | Methodology (+Dissemination and IT) |
| 0.2 | Management decision on metadata strategy | | -1 | -1 | Approval of strategy paper | Top level Management |
| 0.3 | Development of work plan for metadata project | | -1 | 0 | Project organization established and communication plan prepared | Methodology |
| 2.1 | Define how metadata can support the information on the website <ul style="list-style-type: none"> Design issues (user-friendliness) Integration with StatBank and other dissemination products | <i>Dissemination of statistical information (website)</i> | 0 | 6 | Information structure User interface Integrated search | Dissemination (+ IT and SMU) |
| 1.1 | Analysis of known problems (FAQ, typical problem types, e.g. what variables to use) | <i>User needs and feedback</i> | 0 | 2 | Report on known problems | Dissemination (+SMU) |
| 1.2 | Focus groups discussing the roles of metadata | | 3 | 6 | Report with results from focus groups | Dissemination (+Methodology) |
| 3.1.1 | Definition of quality standard. Start with existing information. (e.g. SIMS with additional elements in order to fulfill user needs). Short term: Quality declarations ready for all subtopics | <i>Improving the quality of statistical data and transparency of methodologies</i> | 7 | 12 | Quality Standard fulfilling the needs approved | Methodology |
| 3.1.2 | Decide on software, e.g. Colectica, (put into separate line) based on decisions on the selected 5 functions of metadata from the UN publication Common Metadata Framework, decision on DDI/SDMX, short analysis on needs from internal users | | 0 | 6 | Analysis of alternative IT solutions and recommendation | IT (+Methodology and Dissemination) |
| 4.1 | Documentation, standardization and harmonization of common concepts, classifications, code-lists (short term: e.g. cover all series reported to OECD.) | <i>Methodological activities</i> | 0 | 12 | Complete overview of common concepts, code-lists etc. | Methodology (+IT and Dissemination) |
| 4.2 | Enter the common elements (concepts etc.) into Software system | | 13 | 15 | Common elements entered into IT solution | IT (+Methodology) |
| 5.1 | Adoption of GSBPM | <i>GSBPM: Planning, implementation, evaluation and documentation of statistical processes + guidelines</i> | 0 | 3 | GSBPM adopted | Management (+Methodology) |
| 5.2 | Development of guidelines to be used for simple documentation of processes | | 3 | 4 | Guidelines on how to document processes | Methodology (+SMU) |
| 5.3 | Documentation of existing processes using a simple template based on GSBPM | | 5 | 12 | Selected surveys (statistics) documented | SMU (+Methodology) |
| 5.4 | Development of guidelines on the use and production of metadata in the production processes | | 13 | 16 | Guidelines on how to use and produce metadata following a GSBPM framework | Methodology (+SMU) |
| 5.5 | On all future surveys, guidelines are followed and common elements (from Colectica) are used | | 18 | | Metadata available | SMU (+Methodology and IT) |

Annex 1. Terms of Reference

Subject / purpose of activity E4.1

The purpose of the activity is

- to introduce ICBS staff to the methodology of building a metadata system; *and*
- together with the ICBS to define a work plan/milestones for a work plan for the development of a metadata system for ICBS.

Expected output from activity E4.1

Report with recommendations on how to organize the metadata work as part of the dissemination strategy of the ICBS.

Annex 2. Programme: 24-26 February 2014

| Date | Place | Time | Event |
|-------------|-------|-------|---|
| Mon 24/2 | CBS | 09:00 | Welcome and introduction |
| | | 09:15 | ICBS: Metadata in ICBS – relations to project components C and E |
| | | 10:30 | Coffee break |
| | | 11:00 | What is metadata? <ul style="list-style-type: none">• Basic definitions and concepts |
| | | 12:15 | Lunch |
| | | 13:30 | Use and functions of metadata |
| | | 14:15 | International metadata work and standards <ul style="list-style-type: none">• SDMX• DDI• GSBPM• ESS/EU standards and tools |
| | | 16:00 | End of day 1 |
| Tue 25/2 | CBS | 09:00 | Statistics Denmark: the on-going metadata project <ul style="list-style-type: none">• Background – history and user focus groups• Defining and delimitating the project• Planning and organizing the metadata work<ul style="list-style-type: none">◦ <i>Templates</i>◦ <i>Roles</i>◦ <i>Phases and processes</i> |
| | | 10:30 | Coffee break |
| | | 11:00 | Metadata systems <ul style="list-style-type: none">• Different types of systems, and how they work together |
| | | 12:15 | Lunch |
| | | 13:30 | Discussion: Elements of a work plan <ul style="list-style-type: none">• Specific short-term needs• ICBS inter-linkages and dependencies, incl. other Twinning initiatives• Search function – different types of search, and relation between statistical metadata and search metadata• Project phases and milestones |
| | | 16:00 | End of day 2 |
| | | 09:00 | Ad-hoc meetings <ul style="list-style-type: none">• MS expert and RTA draft work plan and prepare for debriefing |
| | | 11:00 | Debriefing |
| Wed 26/2 | CBS | 13:00 | End of meeting 1 |

Annex 3. Persons met

| Name | Organisation | Department |
|--------------------------|---------------------|--|
| Hadar Gotesman | Bank of Israel | Stats & Info |
| Vered Tayar | Bank of Israel | Israel, Stats & Info |
| Carole Feldmann | ICBS | Demography and Census |
| Lior Yeschayahu | ICBS | Economic Infrastructures |
| Nili Karshai Bibi | ICBS | International Relations & Stat. Coordination |
| Anat Katz-Avram | ICBS | International Relations & Stat. Coordination |
| Batia Attali | ICBS | International Relations & Stat. Coordination |
| Odelya Elisheva Shmuelov | ICBS | International Relations & Stat. Coordination |
| Olivia Blum | ICBS | International Relations & Stat. Coordination |
| Sigalit Mazeh | ICBS | International Relations & Stat. Coordination |
| Yotal Weiss | ICBS | International Relations & Stat. Coordination |
| Rami Harel | ICBS | IT |
| Shahar Katz | ICBS | IT |
| Yossi Nissim | ICBS | IT |
| David Wajnryt | ICBS | Macro-economics |
| Gennady Ackerman | ICBS | Macro-economics |
| Tali Shalem | ICBS | Macro-economics |
| Tuly Berlyanchik | ICBS | Macro-economics |
| Yulia Malka Levinger | ICBS | Macro-economics |
| Arkady Shneider | ICBS | Macro-economics |
| Idit Ofek-Eldar | ICBS | Micro-economics |
| Yaniv Raizner | ICBS | Micro-economics |
| Boaz Ben Aharon | ICBS | Micro-economics |
| Merav Pasternac | ICBS | Micro-economics |
| Inna Sapozhnikov | ICBS | Micro-economics |
| Tom Caplan | ICBS | Office of the Government Statistician |
| Yael Natan | ICBS | Information and Media Relations |
| Mirit Cohen | ICBS | Information and Media Relations |
| Dalit Cohen-Lerner | ICBS | Chief Scientist |
| Bilha Rosenberg | ICBS | Administration and Human Resources |
| Sari Paz | ICBS | IT |
| Ronit Nissimbaom | ICBS | Business Economics Industry and Business |