After a data harmonization project is formally authorized and its high-level scope is identified, a designated project manager develops a detailed work plan that helps guiding the harmonization of data requirements falling into the scope of interest.

A project manager of a data harmonization project, in cooperation with appropriate stakeholders, should:

- Identify and list the required tasks in a logical sequence;
- Form management and work teams;
- Estimate the efforts required for carrying out each task;
- Develop a project schedule;
- Assign tasks to team members including data analysts; and
- Develop a detailed project plan.

### 3.1 IDENTIFYING TASKS IN A DATA HARMONIZATION PROJECT

To identify project tasks, one can use a technique normally used in developing a work breakdown structure. A work breakdown structure is basically an output-oriented description of project tasks. It typically starts with outputs. The work components of the outputs are then broken down into the tasks necessary to achieve them.

In the context of data harmonization, it is necessary to identify the tasks required to derive the following outputs:

- A list of (paper/electronic) documents and messages that fall within the scope of the data harmonization project
- A set of data dictionaries that include the data that corresponds to the identified list of designated documents and electronic documents and messages
- A National Data Model that 1) consolidates data requirements listed in each data dictionary and 2) contains the standard semantic definition and representation format for each data requirement mapped to a data model
- A set of Message Implementation Guidelines for key documents that supports both UN/EDIFACT and XML message syntaxes

The steps listed in this Guide can be adopted as project tasks. Table 3.1 provides a snapshot of main tasks that data analysts need to carry out to derive each project output.

### 3.2 PREPARING MANAGEMENT AND TEAM FOR DATA HARMONIZATION IMPLEMENTATION

In implementing a data harmonization project, it is essential to establish project management and to assign roles and responsibilities clearly to team members, in order to ensure a high-quality successful implementation. This part of the Guide describes the roles of project sponsors, project leader/manager, a change management unit, and team members.

#### a. Identifying the right project sponsor

Project sponsors, committed senior executives representing the key stakeholders of a project such as the Single Window implementation, who will oversee the data harmonization project, provide advice on the project’s directions and make policy decisions, should be
identified. They will regularly review project status, take note of emerging issues and risks, and provide direction on overcoming any issues and risks and approve potential solutions. They will be also responsible for convincing stakeholders and concerned parties that the results gained from the data harmonization project will be implemented.

b. Assigning a competent project manager

The project manager is an individual with strong management and communication skills who understands the operation and objectives of the project implementation. This individual is responsible for planning, monitoring, controlling, and adjusting the project plan, its execution and the quality of the outputs. It may help if a project manager has a good understanding on electronic data interchange and/or experience in implementation and operation of large-scale information systems.

c. Designating Change Management Unit

A Change Management Unit (CMU) is the group authorized to oversee a version control and manage any revision of the standard that may occur as a result of a project. The CMU will assess the feasibility of any issue, analyse the impact of a change, decide on the necessity of the requested change, and determine the need for formal verification of the change.

d. Comprising team members

Team members for data harmonization implementation may include data analysts, data modelers, and technical engineers who may perform the following roles. It is also highly recommended to include business domain experts to properly collect and integrate business requirements. Typical functions of data analysts, data modelers, and technical engineers are listed below. Depending on the expertise available, a team member may take on multiple functions.

Data Analyst

- Conduct data analysis
- Organize data elements and their attributes in a comparable manner
- Describe different attributes of data elements including their definitions, their representation format, and the number of times (occurrence) that a particular type of data could appear in a document.
- Work with domain experts or data owners to prepare the required data.
- Provide support by addressing data related errors, provide any potentially new data required as a result of changes and perform data maintenance activities as project moves through the various levels of testing.

Data Modeler

- Translate business requirements into conceptual, logical and physical data models with a focus on issues such as reducing redundancy of data within an existing computer system or improving the way in which it moves from one system to another.
• Design, build, and maintain the logical and physical data models to support the business requirements in a dynamic, client oriented environment.

• Develop data models for organizational data domains.

• Work with resources resulting from development, data architecture, and business units to create an integrated model for operational database and data warehouse.

**Technical Engineer**

• Update and maintain all technical specifications

• Provide guidance on technical and architectural issues related to international standards and best practices

The tasks of the different participants in the data Harmonization Project are outlined in Table 3.2:

### 3.3 ESTIMATING EFFORTS FOR EACH TASK IN A DATA HARMONIZATION PROJECT

Based on the identified tasks, the project manager estimates the time required to complete each task. In a data harmonization project, significant amounts of time and effort are spent on analyzing and defining data elements and mapping the local definitions to a standard definition. This is particularly in the cases where:

• Instructions or international conventions that define data requirements in the documents are not available.

• Forms with sample data are not available.

• Forms that carry data elements under the scope of harmonization are not aligned with the international standards.

In these circumstances, data analysts need to consult the owner of the document from which data elements are extracted from in order to gain a better understanding of the data elements. With better understanding, data analysts are able to provide a definition for each data element with greater accuracy.

There is no standard benchmark time to complete each step in a data harmonization project. Describing the data definition, representation format, and the number of times (occurrence) that a particular type of data could appear in a simple document may take only one hour. For a complicated document, the same task may take more than one working day. Likewise, there is no one-size-fits-all solution to determine the amount of required resources. However, the Project Evaluation and Review Technique (PERT) may be helpful for time and resource estimation (Marchewka, 2006).

**Table 3.2. Summary of project team roles and responsibilities**

<table>
<thead>
<tr>
<th>Responsibilities</th>
<th>Project Sponsor</th>
<th>Project Leader/Manager</th>
<th>Change Management Unit</th>
<th>Data Analysts</th>
<th>Data Modelers</th>
<th>Technical Engineers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Management</td>
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<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Planning</td>
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<td></td>
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<tr>
<td>Project Monitoring and Control</td>
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<tr>
<td>People Management</td>
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<tr>
<td>Development Process and Operation</td>
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</tr>
<tr>
<td>Change Management</td>
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<tr>
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</tbody>
</table>
3.4 DEVELOPING A PROJECT SCHEDULE

Based on the set of tasks identified in a logical sequence, the project task estimates, and the duration of the project stated in the contractual arrangement made with the project sponsor, the project manager prepares the project schedule. The schedule containing the start date, the finish date, and duration of time to complete each output can be presented in the form of a Gantt chart (Marchewka, 2006).

3.5 DESIGNATING TASKS

The number of data analysts/modellers required on a project depends on the project scope and duration specified by the project sponsor. The shorter the project duration is or the broader the project scope is, the larger the number of data analysts/modellers is required. In a data harmonization project, data analysts/modellers are responsible for:

- Describing different attributes of data elements including their definitions, their representation format, and the number of times (occurrence) that a particular type of data could appear in a document.
- Organizing data elements and their attributes in a comparable manner.
- Developing message implementation guidelines.

Data analysts/modellers should be selected based on the following skills:

- Technology skills: Although it is not necessary, basic knowledge of database management and data modelling techniques is desirable. Related work experience in information systems development is complementary.
- Business/organization skills: It is useful if they have a knowledge of a particular organization or industry under the scope of data harmonization.
- Interpersonal and communication skills: It is important that they are able to effectively communicate and interact with the project’s stakeholders. They should have the ability to create and sustain reasonably good relationships with the people who represent the owner of documents under the scope of the data harmonization project.
- Analytical skills: They should be able to think critically. They should be mindful and capable of spotting the commonalities in the differences, i.e. 1) data elements with different names but with an identical definition and 2) data elements with identical names but different definitions. Finally, they should be able to organize captured data elements in a comparable manner.

Box 1: Project Evaluation and Review Technique (PERT)

The PERT provides probabilistic treatment of activity duration in the estimation. The PERT estimate may be used to compute a weighted average for each individual task. A three-point estimate includes pessimistic, most likely, and optimistic times as described below.

- The Optimistic Time is the minimum time in which a task can be completed. It is the best-case scenario set with the assumption that all activities go as planned and no internal or external obstacles will occur.
- The Most Likely Time is an estimate of the expected time that is required to complete the task.
- The Pessimistic Time is the maximum time of the worst-case scenario in which the task should be completed.

To calculate the estimated time it takes to complete each step, the most likely time, and the pessimistic time have to be identified and placed in a following equation.

\[
\text{Task Estimate} = \frac{\text{Optimistic Time} + (4 \times \text{Most Likely Time}) + \text{Pessimistic Time}}{6}
\]
3.6 DEVELOPING A DETAILED PROJECT PLAN

The project manager compiles the project task estimates, project schedules and project staff into the detailed plan. The detailed plan should be circulated to all project stakeholders for comments and resource reconciliation. It is important that the project manager takes into account their feedback and ensure that the plan is realistic.