

# Labour Market Information Systems

The identification of labour market issues in both developed and developing economies critically rests on the availability of data, information and analysis. Labour market information (LMI) provides an essential basis for employment and labour policies, and informs the design, implementation, monitoring and evaluation of policies that are better focused and targeted. LMI also contributes to a reduction in the transaction costs of labour markets as it helps overcome incomplete information of labour market agents.

## Functions of an LMIS

**Three main functions** of a Labour Market Information System (LMIS) can be distinguished:

- (F1) The LMIS is responsible for labour market analysis;
- (F2) The LMIS is responsible for monitoring and reporting on employment and labour policies;
- (F3) The LMIS system provides a mechanism to exchange information or coordinate different actors and institutions that produce and utilize labour market information and analysis.



The first function (F1) is purely analytical and as such is usually being undertaken, at least to some extent, by academic and research institutions, which may or may not have a focus on labour markets. However, the main purpose of LMIS that have been established outside academia is the production of information and analysis for policy-makers and other labour market stakeholders. For example, the functions of the European Employment Observatory are stated as follows: “The European Employment Observatory (EEO) contributes to the development of the European Employment Strategy (EES) through the provision of information, comparative research and evaluation on employment policies and labour market trends in the countries covered by the EEO.”

Therefore it is important that institutional arrangements are established to make the information and analysis widely available to the target group and to provide opportunities for labour market stakeholders to influence the agenda of the LMIS.

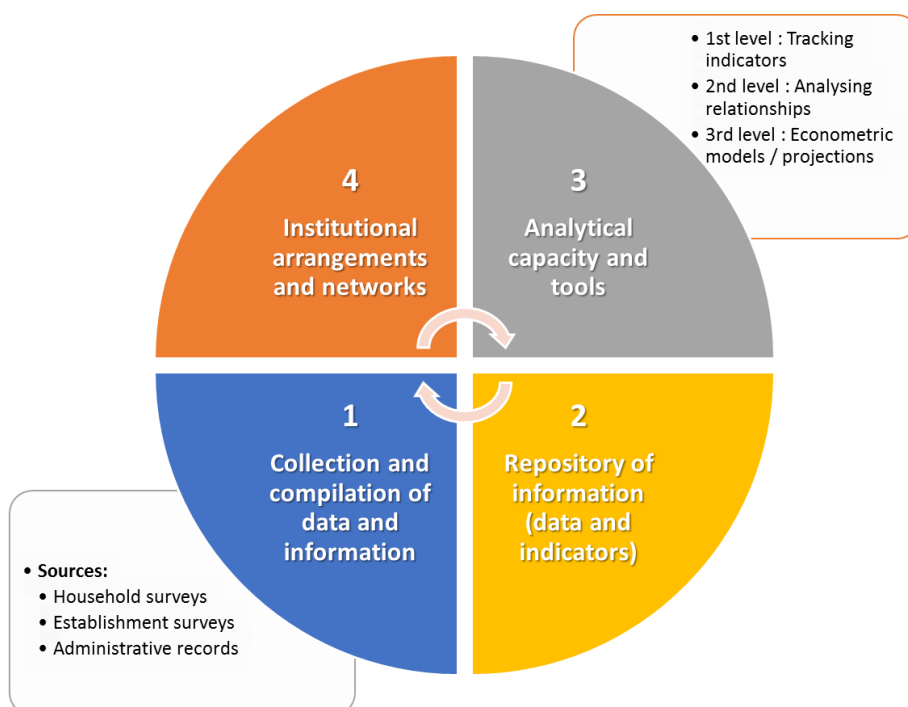
The LMIS can also be directly involved in monitoring and reporting on employment and labour policies (the second function, F2). If in addition to monitoring and reporting on policies the LMIS is used to conduct policy analysis and evaluations, the system would combine functions F1 and F2. Both at the international and the national levels, the institutional role of the LMIS can be broadened to include a third function (F3), the exchange of information or coordination of the LMIS activities of labour market stakeholders, which include statistical agencies,

research agencies and agencies involved in policy formulation and implementation including employers' and workers' organizations. This function may range from the dissemination of information on concepts, definitions and standards, to the allocation of resources regarding data collection or specific analytical activities (e.g. evaluations, econometric models).

## Components of an LMIS

LMIS consist of **four main components**:

- (C1) Collection and compilation of data and information;
- (C2) Repository of information;
- (C3) Analytical capacity and tools;
- (C4) Institutional arrangements and networks.



With regard to component (C1), and given that LMIS should provide analyses of labour markets in their economic context, **collection or compilation of data** consists not only of data on labour markets, but also on the broader economy. For example, data on trade flows and remittances are indispensable for an analysis of the labour market effects on economic crises.

**The main data sources** of labour statistics consist of:

- (S1) Household surveys and population censuses;
- (S2) Establishment surveys;
- (S3) Administrative records.

**Labour force surveys** can be designed to cover virtually the entire population of a country, all sectors of the economy and all categories of workers, including own-account workers, contributing family workers and persons engaged in casual work or marginal economic activity. For this reason, household-based labour force surveys offer a unique advantage to obtain information on the labour market of a country and its structure. Other sources, such as

population censuses, multi-purpose household surveys, establishment surveys, or administrative records (e.g. employment service records), differ in scope, coverage, units of measurement or methods of data collection.

Each source has advantages and limitations in terms of the cost, quality and type of information gained. For example, **establishment surveys** typically have poor coverage of very small or unregistered businesses but are a more reliable source on wages and earnings. Similarly, **administrative records** provide a low-cost source of labour market information, but this information is limited by the purpose of the records, which may be different from that of an analyst or policy-maker. Therefore, **effective LMIS draw on all sources**.

This information collected and/or derived from primary sources must be stored and made accessible to users by means of a software platform which will constitute the sole **repository of labour market information** (C2). Inbound data flows of collected data should be verified in terms of both structural and logic consistency, transformed into new indicators as necessary and stored in the datawarehouse to be disseminated in through several channels, including but not limited to graphical visualizations, statistical tables, bulk data download and application programming interfaces (API) for computer-to-computer interactions.

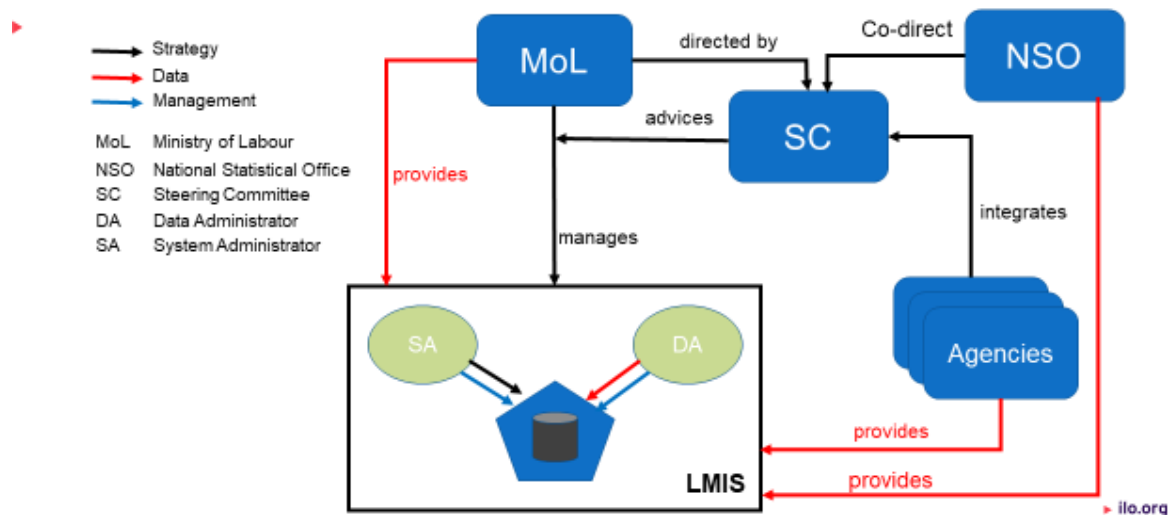
LMIS embody the analytical capacity to identify and interpret labour market developments and trends, and to relate these trends to policies or other factors influencing labour market outcomes (C3). In terms of **analytical capacity**, LMIS can be developed at **three levels**. The core or first-level LMIS consists of monitoring or tracking a set of indicators. Activities that need to be undertaken to establish a core LMIS, such as the compilation of data, the establishment of appropriate repository, the production of regular labour market reports and the dissemination of information and analysis, can be carried out by an LMI unit in a government department, in collaboration with labour market stakeholders, statistical agencies and research institutions. The unit should be staffed by labour market analysts, statisticians and staff dealing with the processing of data and information technology. The monitoring of indicators not only results in signals on the state of the labour market, but also provides a starting point for a range of additional analytical activities and studies, focusing on relationships in the labour market and between the labour market and the broader economy (second-level LMIS). The analysis of relationships involves the use of quantitative methods (e.g. regression analysis), but may also employ qualitative methods (e.g. stakeholder-driven forums). In all cases, analytical activities will draw on or will need to be complemented by a first-level LMIS tracking labour market indicators. The third and most advanced level of LMIS involves the use of comprehensive econometric models, building on second-level analysis. Econometric models represent an analytical approach that allows for the generation of economy-wide, detailed and consistent projections of labour market developments. Econometric models, however, are demanding in terms of all components of LMIS (C1, C2, C3 and C4) and are therefore costly to develop and maintain. In many cases, the development of models is undertaken by specialized research institutes, while LMI units may be involved in running existing models and/or use results from modelling exercises for policy development purposes.

**Institutional arrangements** (C4) enable labour market actors to use information and analysis, and facilitate the creation of networks of users and producers, including government departments, employers' and workers' organizations, statistical agencies and research organizations. These arrangements are needed for the LMIS to effectively perform its analytical function, for example by providing access to data (from statistical agencies, administrative bodies and other entities), but also to allow for the effective dissemination of information and analysis. An example of a straightforward institutional arrangement is the establishment of an

LMIS Advisory Panel (or a Steering Committee) joining policy-makers, the statistical agency and workers' and employers' organizations.



## Agency and role responsibilities (example)



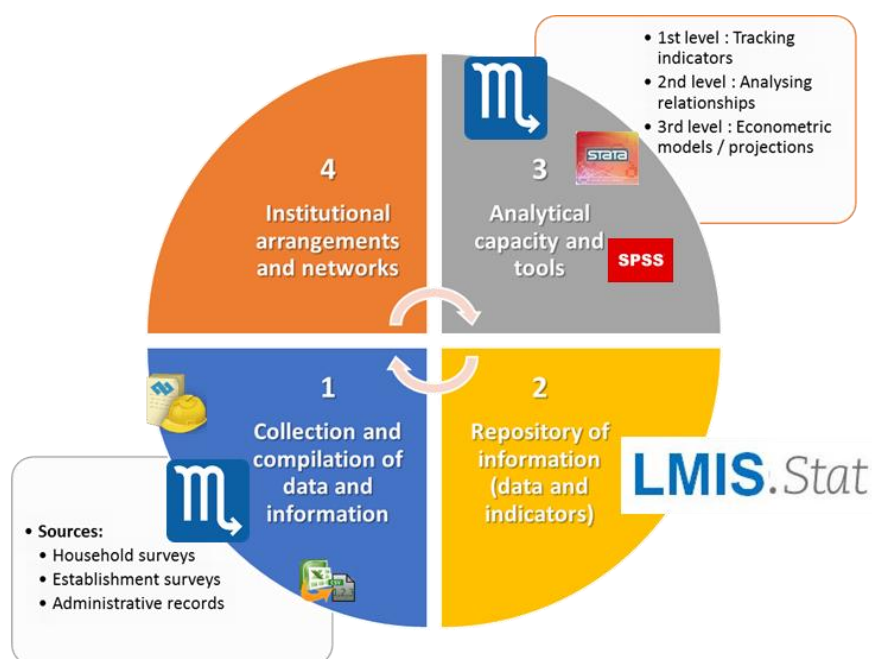
A strong role of the LMIS with regard to policies (F2) and coordination (F3) necessitates institutional linkages between the system and the process of formulating and monitoring national socio-economic plans, including national employment policies, poverty reduction strategies and other development plans. This may also involve the selection of a set of indicators that are monitored to track progress in the achievement of labour market objectives, or the setting of targets for certain indicators. Institutional arrangements could also encompass institutions involved in the implementation of policies.

## Indicators

As discussed above, at a minimum, LMIS track a set of indicators, which constitute the basis for the development of more advanced systems. A widely used set of indicators are the **Decent Work Indicators** framework (DWI) which can be found in **ILOSTAT**, the core statistical information system of the ILO ([ilostat.ilo.org](http://ilostat.ilo.org)). DWI covers not only access to full and productive employment, but also rights at work, social protection and social dialogue, as well as indicators of the economic and social context of decent work.

Amongst the more than 400 indicators and breakdowns in ILOSTAT, an initial group should be selected in order to: (1) present a core set of labour market indicators; and (2) improve the availability of the indicators to monitor new employment trends. This initial set of indicators is selected in consultation with national representatives from the Ministry of Labour, the National Statistical Office and other stakeholders, based on the following criteria: (a) conceptual relevance; (b) data availability; and (c) relative comparability across countries and regions. Following this initial set, new indicators will be progressively added based on demand and data availability.

## ILO Technical Assistance and Tools for implementing a LMIS



As it has been mentioned in the above paragraphs, a LMIS aims to the production, storage, dissemination and use of labour market related information and results. These constitute the core phases of a statistical process, as defined by the Generic Statistical Business Process Model (GSBPM).

Therefore, the implementation of a LMIS will require processes and tools, mainly for data collection and processing, and for storage, management and dissemination of both data and related metadata, but should not be difficult to integrate in any statistical production environment.

**Compilation of data and metadata:** LMIS' indicators are to be produced from different data sources (See above). Depending on the level of integration with the production system, some transformations may be required in this source data, either to compute the indicators from microdata or to transcode some of them to match the coding scheme of the repository. For both functionalities, **ILOSTAT SMART** (Statistical Metadata-driven Analysis and Reporting Tool) is provided by the ILO at no cost.

For reference metadata management and exchange, the standard DDI template provided by IHSN and the associated Metadata Management Toolkit, also available at no cost, are suggested. It is also possible to define an ad-hoc metadata template for the LMIS.

**Repository of Indicators:** The tool recommended for storage and dissemination of LMIS indicators is **.Stat Suite**. This powerful platform is available for those countries implementing LMIS through an agreement between ILO and OECD and the Statistical Information Systems – Collaboration Community (SIS-CC).

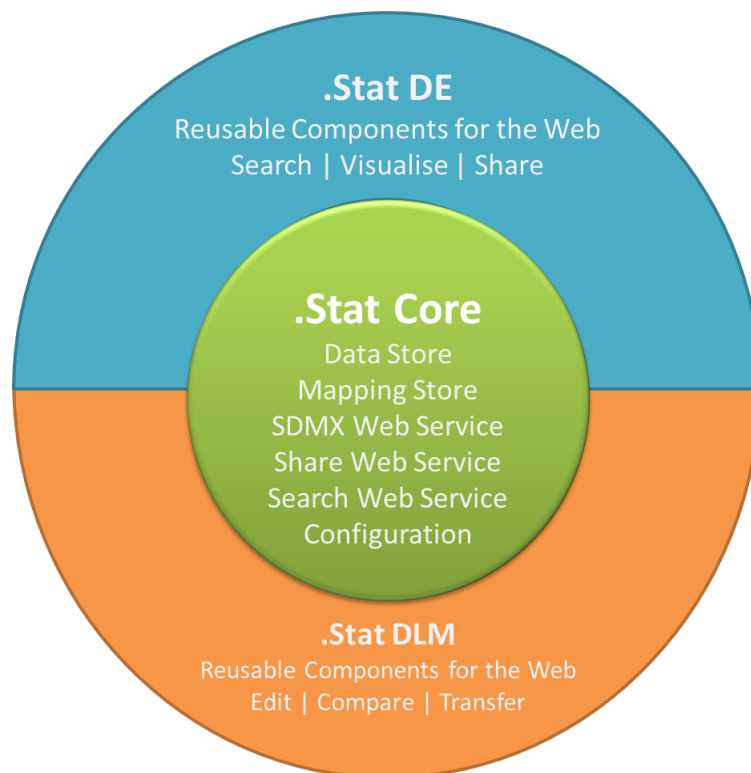
Amongst many **reasons** why **.Stat** has been selected as the tool for implementing a LMIS, it worth mentioning:

- **High quality product:** **.Stat** is one of the most advanced statistical information systems' platform currently used in the official statistics community. Its architectural design and development process follows the recommendations and best practices in application lifecycle management to obtain a robust and reliable product.
- **Affordable investment:** Under the “umbrella” of ILO's membership to the SIS-CC, a country implementing a LMIS can use the product and receive first level support and

free upgrades. The only investment required to the country are the expenses associated to the deployment of the platform and training on .Stat administration and data/metadata management.

- **Community values:** The SIS-CC promotes a series of values that are aligned with ILO principles, like *Partnership* (Collaboration rather than a vendor/client relationship), *Transparency* (Information openly and transparently shared among members), *Commitment* (To respecting the coordinated work plans put in place), *Industrialisation* (Outputs developed according to best practices in application lifecycle management), and *Standards* (Foster and promote internationally defined standards, such as [SDMX](#), [GSBPM](#), [GSIM](#), and [CSPA](#)).
- **Sustainability:** The collaborative approach for development, and the number of institutions using the software minimize the risk of support or further development being interrupted, an inconvenient situation that unfortunately is quite common when contracting external developers.

The architecture of .Stat Suite is composed by three modules:



- **.Stat Core:** In the centre of the architecture, it includes the functions related to data and metadata storage, configuration and the SDMX, Share and Search web services.
- **.Stat Data Lifecycle Manager:** As already mentioned, the DLM is the “backoffice” interface for data and metadata management.
- **.Stat Data Explorer (DE):** The DE, entirely composed by Reusable Components for the Web (RCW), is the user’s interface to search, visualize (in several formats) and share LMIS data.

**.Stat** provides four main functions:

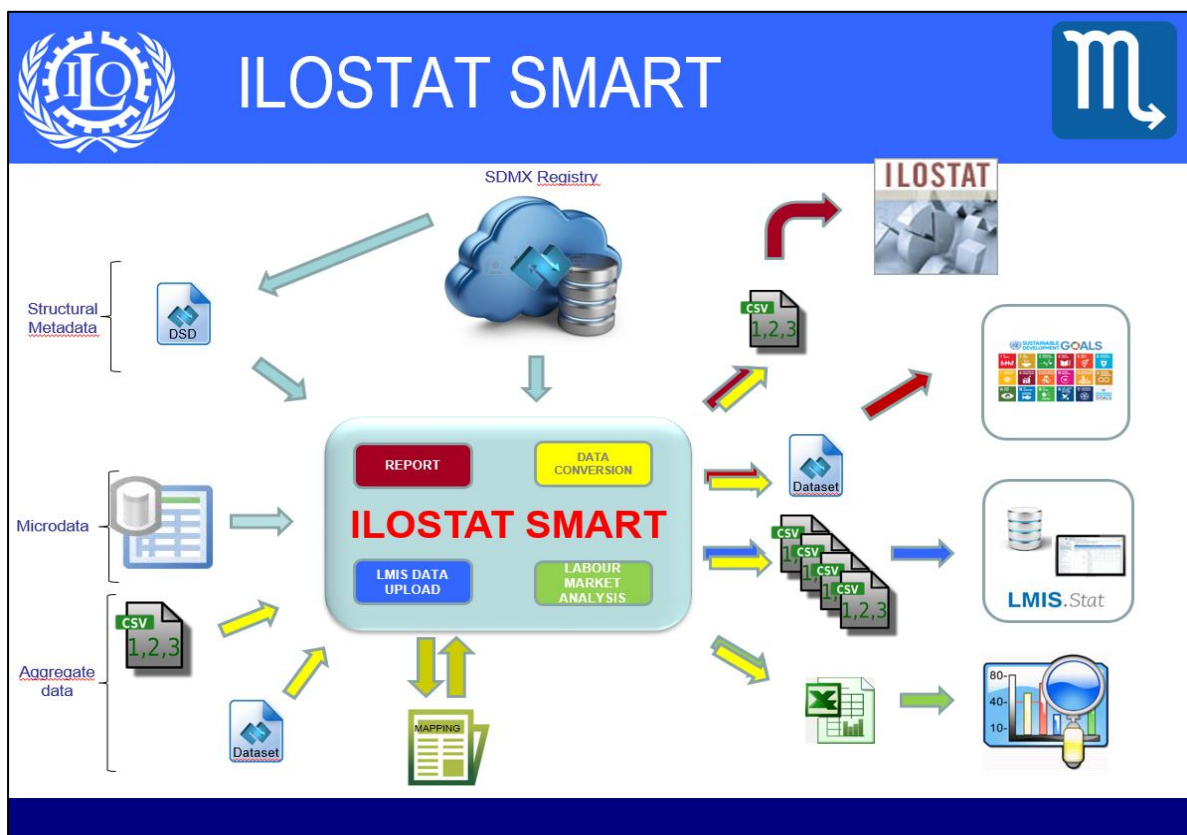


- **Data Upload:** The Data Lifecycle Manager (DLM) is a front-end application to load and process data into the Data Warehouse. Data can be in csv, Excel or sdmx format.
- **Data Storage:** Based on Microsoft SQL server and a standard star schema data warehouse technology.
- **Data Exit:** A single exit point serves all outputs from the Data Warehouse exposing the data to several dissemination tools through a set of Web Services to Search data, Visualize and Share results. SDMX based web services allows interfacing with a number of re-usable web components for data visualization and reporting.
- **Data Analysis:** .Stat allows for the extracting of data to various analytical tools for further data analysis.

The interaction between both DLM/DE and .Stat Core is 100% based on SDMX standard web service, ensuring interoperability for data integration to/from other systems implementing such standard.

In this regard, a smooth migration path from Version 7 to .Stat Suite is possible by adding to .Stat v. 7 a new web service which implements a fully compliant SDMX 2.1 API (already available) and connecting through this interface the new .Stat Data Explorer. This makes possible all the new features in terms of data visualization that are delivered by the DE, while not having to change the production process.<sup>1</sup>

**Data collection and formatting: ILOSTAT SMART**, the multipurpose statistical processor and transcoder developed by ILO, is compatible with current and future versions of .Stat, serving the purpose of data and metadata preparation for uploading to .Stat.

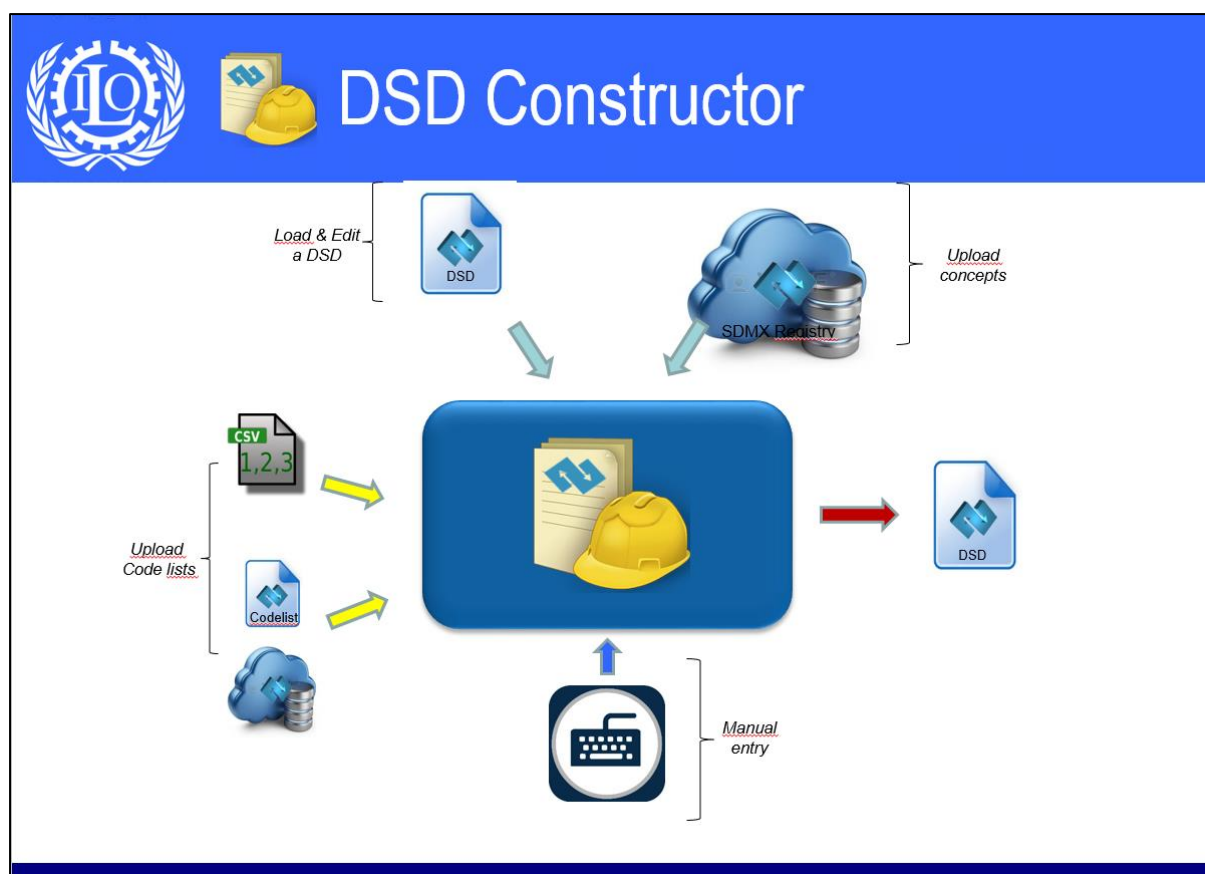


<sup>1</sup> The actual possibility of this interoperation depends on data modelling aspects of the v.7 database.

Using SMART, the definitions of the indicators are downloaded from the Repository using SDMX or are received in a SDMX-ML file. Based on such definitions, the user creates the mapping of each concept in the tables with the variables in the input file, which can be either microdata or aggregate data. This mapping can be saved for future re-use.

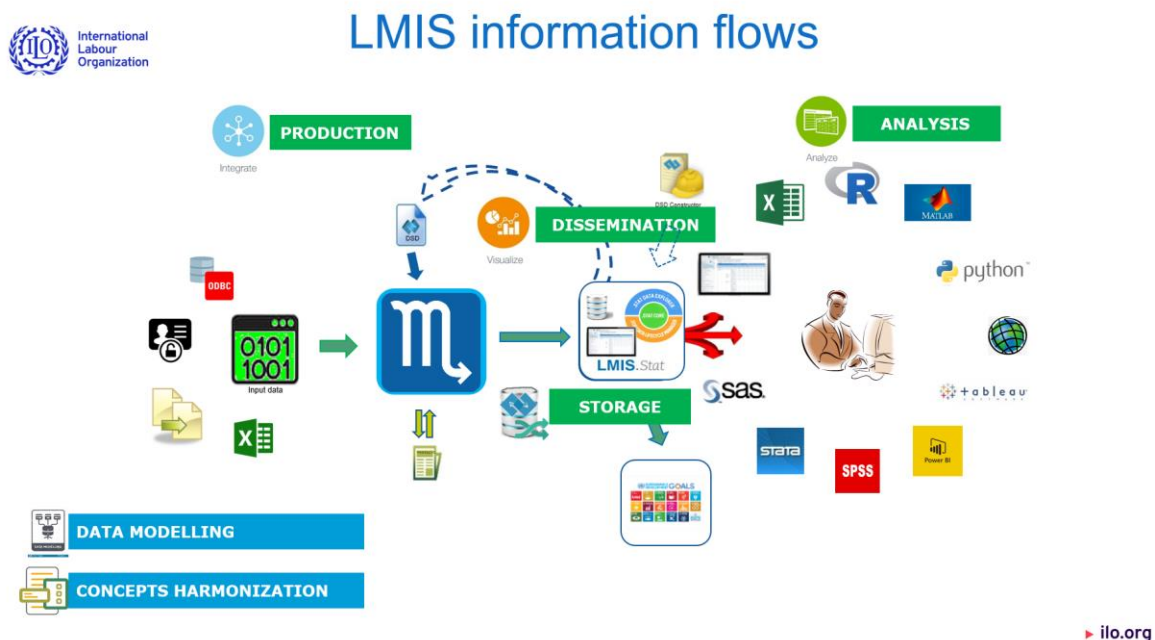
Once the mapping has been established and the basic aggregation rules defined, SMART will generate the output in the right format required to update an LMIS.Stat system, or to report to ILOSTAT or the SDG collection agency. It can also generate Excel reports for pre-analysis of the outputs, for example to decide which variant of a classification to use based on cases coverage.

The **DSD Constructor** is a perfect companion tool for SMART, allowing the creation and edition of the main SDMX structural metadata artefacts (DSD, Codelist, Dataflow, etc) in order to define the conversion rules.





**DSD Constructor** and **SMART** provide also direct upload of metadata structures and datasets to the .Stat Suite datawarehouse to facilitate the data production of indicators, not only for the LMIS, but other reporting needs as well.



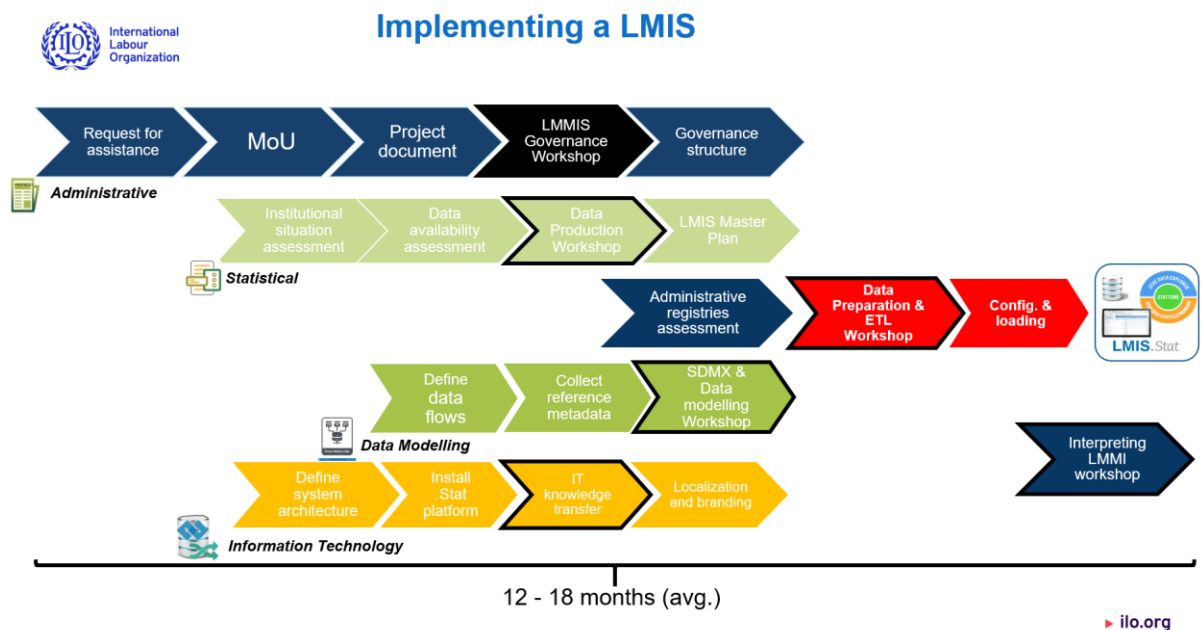
## LMIS project implementation

The **general objective** of the project is to develop a network of institutions, people and information with mutually recognized roles, agreements and functions with respect to the production, storage, dissemination and use of labour market information and outcomes, in order to maximize the potential for the formulation and implementation of relevant policies and programmes.

The ILO provides technical assistance to constituents willing to implement an LMIS in order to:

1. Improve and modernize the collection, processing, systematization and harmonization of information on labour, from different internal and external sources. Standardize statistical information on key market indicators to facilitate the reporting and management of labour market statistics in the country.
2. Provide labour market information that is relevant, accurate and timely at the highest level to decision makers.
3. Establish a suitable governance structure to make the System operate in an efficient and sustainable way with the participation of all the stakeholders in the production and use of LMI.
4. Identify the sources of information for the Labour Market Indicators, collect reference metadata and harmonize the definitions of the indicators and classifications used in all of them.
5. Build capacities in the technical personnel, in their different profiles, in the administration and use of the tools to implement the LMIS, including training in data modelling and SDMX.

6. Train analysts and decision makers in the interpretation of labour market indicators
7. Make the LMIS.Stat platform available to the public



The **main activities** carried out after an official request from the Government has been received, in order to build capacities in the required personnel and make the LMIS available to the public, are the following:

1. Assessment of the viability for an LMIS in the country, based on the data availability and institutional situation.
2. Signature of a Memorandum of Understanding and Project Document between the Government (represented by the lead agency implementing the LMIS) and the ILO (represented by the Country/Regional office)
3. Establish governance structure and appoint operational roles
4. Define system architecture
5. Deployment of data warehouse platform (LMIS.Stat)
6. Identify the sources of information for the Labour Market Indicators, make provision agreements with the data providers, collect reference metadata and harmonize the definitions of the indicators and classifications used in all of them.
7. If necessary, carry out a consultancy following the methodology developed for leveraging the use of administrative records as statistical data sources.
8. Define initial set of indicators (variables and classifications) to be implemented in the LMIS.Stat platform
9. Define a harmonized concepts scheme common to all indicators.
10. Publish the LMIS Master Plan and the Governance Manual by the implementing agency
11. Perform knowledge transfer for the configuration and administration of the LMIS.Stat platform by IT staff
12. Conduct a training workshop oriented to Data Production aimed at statistical staff, economists and data and metadata managers.

13. Carry out an SDMX and Data Modelling workshop, aimed at data and metadata managers of all the data providers for the LMIS.
14. Train data managers and producers in data preparation and ETL<sup>2</sup> to the platform
15. Train analysts and decision-makers in LMI interpretation
16. Configure LMIS.Stat tool for live production, including the design of statistical themes (indicator clustering through Categorisation), user interface design (what needs to be customized), logos (specifications of logo files, images, icons, etc.), localization of text labels and translations, etc..

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<sup>2</sup> Extract, Transformation and Load of data