

**LMIS**

**Set of Templates for Data Collection Forms**

**and**

**LMIS Portal Linkages**

April 2019

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# List of Terms and Abbreviations

|  |  |
| --- | --- |
| Abbreviation | Explanation |
| AQACHEI | Accreditation and Quality Assurance Commission for Higher Education Institutions |
| AG | Advisory Group |
| ALMMs | Active labour market measures |
| ALMPs | Active Labour Market Programs |
| BA | Business Analysis |
| BAU | Al Balqa Applied University; |
| CA | Contracting Authority |
| CASE | Computer Aided Software Engineering |
| CoE | Centres of Excellence |
| CEQA | Centre of Accreditation and Quality Assurance |
| CF | Conceptual Framework |
| CF LMIS | Conceptual Framework LMIS, LMIS for Jordan as foreseen and architectured in the Conceptual Framework document |
| CS | Civil society |
| CSO | Civil society organisation |
| CMS | Content management system |
| DEF | Development employment fund |
| DEVCO | EC Directorate-General for Development and Cooperation (DG DEVCO) |
| DEU | Delegation of the European Union to the Hashemite Kingdom of Jordan |
| DG | Directorate General (of the European Commission) |
| DOS | Department of Statistics |
| EC | European Commission |
| ETF | European Training Foundation |
| ETVET | Employment and technical vocational education and training |
| ETVET-C | ETVET Council |
| EU | European Union |
| GDP | Gross domestic product |
| GIZ | Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation) |
| GoJ | Government of Jordan |
| HEAC | Higher Education Accreditation Commission |
| HR | Human resources |
| HRD | Human resources development |
| IS | Information system |
| IT | Information technologies |
| JICA | Japan International Cooperation Agency |
| KE | Key expert |
| KILM | Key Indicators of Labour Market |
| LM | Labour market |
| LMI | Labour market information |
| LMIS | Labour market information system |
| LMIMS | Labour market information management system |
| M&E | Monitoring and evaluation |
| MIS | Management Information System |
| MoE | Ministry of Education |
| MoHE | Ministry of Higher Education |
| MoL | Ministry of Labour |
| MoPIC | Ministry of Planning and International Cooperation |
| MoSD | Ministry of Social Development |
| MSCoE | Model Skill Centres of Excellence |
| NAF | National Aid Fund |
| NCHRD | National Council for Human Resources Development |
| NGO | Non-governmental organisation |
| NES | National Employment Strategy |
| NEES | National employment electronic system |
| NETVETS | National ETVET Strategy |
| NKE | Non-key expert |
| NMPF | National Policy for Microfinance Framework |
| NSHRD | National Strategy for Human Resources Development |
| NQF | National Qualification Framework |
| PC | Project (Steering) Committee |
| PCM | Project Cycle Management |
| PETS | Public Expenditure Tracking Survey |
| PMP | Performance management programme |
| PIU | Project implementation unit |
| PMU | Project management unit |
| PPF | Project Preparation Facility |
| PPP | Public-private partnership |
| PRS | Poverty Reduction Strategy |
| PWDs | People with disabilities |
| QSDS | Qualitative Service Delivery Survey |
| PSC | Project Steering Committee |
| SME | Small and medium-sized enterprise |
| SC | Steering Committee |
| SS-C | Sector Skills Council |
| SSC | Social Security Corporation |
| STE | Short-term Expert |
| TA | Technical assistance |
| TAT | Technical assistance team |
| TVETC | Technical and Vocational Education and Training Council |
| ToR | Terms of reference |
| TOT | Teaching of Teachers or Training of Trainers |
| TVET | Technical Vocational Education and Training |
| UAT | User Acceptance Tests/Testing |
| UNDP | United Nations Development Programme |
| UNHCR | UN Refugee Agency |
| USAID | U.S. Agency for International Development |
| VTC | Vocational Training Corporation |
| WB | World Bank |

# Version History

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Revision date | Implemented by | Reason |
| 0.9 | April 2019 | Ivan Majerčák, Mohammad Ismail, Luba Pavlovova | Final internal draft, requested peer review within SESIP Project and MoL |
| 1.0 | May, 2019 | Ivan Majerčák, Mohammad Ismail, Luba Pavlovova | Version released for use by The Ministry of Labour |

# Introduction

## Purpose of the Document

This document is an addendum to the document Conceptual Framework. It provides the gap analysis of the possible deployment of the LMIS.Stat solution (ILO) compared to the full functionality of the LMIS, as described in the Conceptual Framework (further referenced as Conceptual Framework LMIS or CF LMIS).

It is divided into two parts:

* **Set of Templates for Data Collection Forms** – this chapter describes the gaps between Conceptual Framework LMIS and the LMIS.Stat solution from the business perspective (connected data sources, work that needs to be done in order to connect remaining sources of LMI). It also discusses the Data Exchange techniques on the conceptual level, from the perspective of formats, protocols and modifications to the existing systems.
* **LMIS Portal Linkages** – this chapter is a technical analysis of the LMIS.Stat solution. It describes technologies in use by the LMIS.Stat solution and their reusability, when building the Conceptual Framework LMIS. This chapter contains also an estimation of the budget required for building the solution on the side of the Jordan Government and institutions.

## Managerial Overview - SWOT

For a brief overview of the advantages and disadvantages of the LMIS.Stat solution, a SWOT analysis was prepared. It contains the main points of the strengths, weaknesses, opportunities and threats of the LMIS.Solution from the perspective of building the full-scale, comprehensive Conceptual Framework LMIS solution for Jordan. The SWOT is based on the assumption, that LMIS.Stat is not a replacement of the CF LMIS, but rather a foundation for building the full CF LMIS.

|  |  |
| --- | --- |
| Strengths | Weaknesses |
| * With LMIS.Stat, implementator can focus exclusively on the data exchange (data acquisition and integration part), the backend system is ready-made. * LMIS.Stat comes with a complete training/capacity building program for both developers and operators of the solution. * The deployment time of the solution counts in weeks, including the trainings. * The deployment can be partially done remotely at no cost for MoL. * The solution comes with an upgrade path and is planned as an Open Source in the future. * The solution is based on widely accepted standards (e.g. WS and SDMX), which should be later prescribed for any solution extensions. * LMIS.Stat comes with an interactive, web based interface for data exploration (filtering, sorting, segregation). Further data processing from LMIS can be done through 3rd party products, such as Excel, PowerBI etc. * LMIS.Stat can accommodate any other indicators and dimensions, not necessarily from the LMI field | * LMIS.Stat is only a tool, it requires capacity on the side of the connected institutions. The trainings provided focus on the tool functionality, not on the LMI acquisition, processing and analysis. * LMIS.Stat does not cover non-aggregated data – it only stores indicators (with a certain level of segregation) but does not have structures for a record level data like students/graduates, vacancies, employers, foreign workers etc. * Can the solution be modified without losing the upgrade path? * Is there any manual/online course for the general public? * The formats used in the solution are (with high probability) not the ones, used in Jordan institutions. |
| Opportunities | **Threats** |
| * LMIS.Stat is “good start” in building LMIS for Jordan – it ignites the interest of the MoL, participating institutions as well as general public and academics. * LMIS.Stat can be a proof of concept for integrating institutions (technically and administratively). * LMIS.Stat can be a proof of concept for maturity of the MoL for sustainable operation of the LMIS in the future (i.e. building and running a Department of Statistics). | * Data is essential – even the best solution will not provide anything without regular data feed, which must be ensured. * Primary basic data must be processed and aggregated to a required level out of the system (i.e. in the transactional systems). Proper capacity and interest must exist on the side of institutions * Capacity building is mandatory from the beginning, otherwise the project will spiral into void. * LMIS.Stat requires concrete technological stack, based on Microsoft products (Windows Server, IIS, MS SQL, MSMQ). Although it is a good and cost-effective choice for building such a solution, it also prescribes the technology for the rest of the solution (unless MoL wishes to host heterogenous solution). * LMIS.Stat requires participation of a local company. The estimated budget is app. 135.000,- JOD, which will have to be secured by MoL in the first year of the deployment. |

# Set of Templates for Data Collection Forms

This chapter contains information about Set of Templates for Data Collection Forms.

It describes the business (logic) aspects of the implementation of the ILO LMIS.Stat at the Ministry of Labour as the core solution. Further in this chapter, the Labour Market Indicators in the ILO LMIS.Stat solution are described as well as discussion about the gaps between target state of LMIS Jordan and ILO solution is provided. At the end of the chapter, the data exchange is discussed on the conceptual level.

## Labour Market Indicators in LMIS.Stat

Following is the list of **Key Indicators of Labour Market (KILM)**, which can be accommodated in the ILO LMIS.Stat solution without further modifications. In addition to the list provided by the ILO, we have added a column indicating a source withing existing IS in Jordan, from which can the data be acquired.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Key Indicators | Segregation possibilities | Data source in Jordan |
| 1 | Labour force participation rate | Sex ; Age (15+; 15-24; 25+) ; Educational attainment | DOS:   * Employed Persons Age 15+ Years |
| 2 | Employment-to-population ratio | Sex ; Age (15+; 15-24; 25+) ; Educational attainment | DOS:   * Percentage of employed persons to total population 15+. * Percentage of employed persons by sex and age group. * Population by Urban-Rural, Sex & Age Group. * Population by Nationality, Sex & Age Group * Jordanian Population by Governorate, Sex & Age Group * Non-Jordanian Population by Governorate, Sex & Age Group (Percentage Distribution). |
| 3 | Status in employment (ICSE) | Sex ; Age (15+; 15-24; 25+) | DOS:   * Percentage of employed persons to total population 15+. * Percentage of employed persons by sex and age group. |
| 4 | Employment by sector (ISIC) - 1 Digit - 21 categories | Sex ; Age (15+; 15-24; 25+) | DOS:   * Data on the numbers and characteristics of workers by sex, nationality, educational level and specialization. * Data on the number of establishments operating in the public and private sectors by economic activity. |
| 5 | Employment by occupation (ISCO) - 2 Digits - 43 Categories | Sex ; Age (15+; 15-24; 25+) | DOS:   * Data on the numbers and characteristics of workers by sex, nationality, educational level and specialization. * Data on the number of establishments operating in the public and private sectors by economic activity. |
| 6 | Informal employment rate | Sex ; Age (15+; 15-24; 25+) ; Economic sector | DOS:   * Labor Force Survey |
| 7 | Time-related underemployment rate (National threshold) | Sex ; Age (15+; 15-24; 25+) | DOS:   * Labor Force Survey |
| 8 | Unemployment rate | Sex ; Age (15+; 15-24; 25+) ; Educational attainment | DOS:   * Total unemployment rate for Jordanians and by sex. * Unemployment rate by educational level. * Unemployment rate by age group. |
| 9 | Long-term unemployment rate (over 1 year) | Sex ; Age (15+; 15-24; 25+) | DOS:   * Unemployed Persons Age 15+ Years by Sex, Duration of Unemployment in Months & Nationality (Percentage Distribution). |
| 10 | Youth not in education and not in employment (NEET) rate | Sex ; Age (15-24) | * Difference between records of MoHE/ET-VET and Labor Force Survey? |
| 11 | Hours actually worked | Sex ; Age (15+; 15-24; 25+) ; Economic Sector | DOS:   * Data on the average number of normal working hours per month (excluding weekends) worked by the employees by major occupational groups in the public and private sectors. |
| 12 | Part-time workers (including involuntary part-time workers) | Sex ; Age (15+; 15-24; 25+) | DOS:  Labor Force Survey |
| 13 | Persons outside the labour force (Inactivity) rate | Sex ; Age (15+; 15-24; 25+) | DOS:  Labor Force Survey |
| 14 | Labour productivity (GDP per employed person, level and growth rate) |  | DOS:   * Gross Domestic Product (GDP) at current prices * Gross Domestic Product (GDP) at constant prices * Gross Domestic Product (GDP) growth rate at current prices * Gross Domestic Product (GDP) growth rate at constant prices |
| 15 | Average hourly earnings of employees by sex, age occupation, and persons with disabilities | Sex ; Age (15+; 15-24; 25+) | DOS:   * Detailed data on the levels of salaries and cash paid to groups of professions, as well as regular and irregular cash bonuses and grants for various professions. * Data on compensation of employees by major occupational groups. |
| 16 | Working poverty rate (Definition TBD) |  | TBD |
| 17 | Participation of youth and adults in formal and non-formal education and training | Sex ; Age (15+; 15-24; 25+) | ET-VET and MoHE |
| 18 | Occupational injury rate, fatal | Sex ; Age (15+; 15-24; 25+) ; Economic Sector | Administrative records of Labour inspection |
| 19 | Occupational injury rate, non-fatal | Sex ; Age (15+; 15-24; 25+) ; Economic Sector | Administrative records of Labour inspection |
| 20 | Labour inspection rate (inspectors per 10,000 employed persons) |  | Administrative records of Labour inspection |
| 21 | Share of population aged 65 years and above benefiting from a pension | Sex | SSC records |
| 22 | Share of economically active population contributing to a pension scheme | Sex ; Age (15+; 15-24; 25+) | * SSC records * Administrative records of MoF |
| 23 | Share of unemployed receiving unemployment benefits by economic activity | Sex ; Age (15+; 15-24; 25+) | NAF records   * Social benefits   SSC   * Unemployment insurance |
| 24 | Number of vacancies advertised through public employment services (average of per month, over the past three months) | Economic Sector ; Occupation | NEES records |
| 25 | Number of new registered Job Seekers in public employment services | Sex ; Age (15+; 15-24; 25+) ; Educational attainment | NEES records |
| 26 | N/A | N/A | N/A |
| 27 | Number of documented foreign labourers in the country (by economic activity and duration of stay, more or less than five years) | Sex ; Age (15+; 15-24; 25+) | MoL – Work Permits agenda |
| 28 | Ratio of documented foreign laboureres in the country over employed population | Sex ; Age (15+; 15-24; 25+) | MoL – Work Permits agenda |
| 29 | Trade Union Membership (% of total labour force, by economic activity) | Sex | Probably data not available as of April 2019 |
| 30 | Rate of days not worked due to strikes and lockouts (per year, by economic activity) | Sex | Probably data not available as of April 2019 |

The conclusion of this mapping exercise is, that in order to provide data sets for all the 30 (29) indicators in question, following systems will have to be integrated with the LMIS.Stat:

|  |  |
| --- | --- |
| Institution | System |
| Ministry of Labour | NEES – National Electronic Employment System |
|  | Working Permits Registry |
|  | Labour Inspection System |
| Social Security Company | Pension System |
| Ministry of Education | Register of Students |
| ET-VET | Register of Trainees |
| Department of Statistics | Statistical System |

## Gaps Between LMIS.Stat and the LMIS Described in Conceptual Framework Document

Following is the list of the expected outputs and gaps in the coverage of the exchanged data between LMIS.Stat and the LMIS described in Conceptual Framework.

The boxes marked as “ILO” mean, that the data with a certain level of aggregation can go straight to the LMIS.Stat, the boxes marked “REC” mean, that the CF LMIS expects broader data set, possibly on the record level for making cross-queries. “OTH” means other requirement for data upload, possibly in an unstructured form.

One box can contain several levels of data exchange, e.g. when the aggregation of the Vacancies is needed for an indicator in LMIS.Stat, but also when a record level data is required in CF LMIS for cross-querying the database/data warehouse.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | MoL | DOS | NCHRD | NAF | JCI | JCC | SSC | VTC | HCD | BAU | MoHE |
| Job seeker / employee | ILO  REC | ILO |  | REC | REC | REC | ILO  REC |  |  |  |  |
| Employer | REC | ILO |  | REC | REC | REC | ILO  REC |  |  |  |  |
| Vacancy | ILO  REC | ILO |  |  |  |  |  |  |  |  |  |
| Foreigners / work permits | ILO  REC |  |  |  |  |  |  |  |  |  |  |
| Students |  | ILO |  |  |  |  |  | ILO  REC |  | REC | ILO  REC |
| Trainings / courses |  |  |  |  |  |  |  | ILO  REC |  | REC | ILO  REC |
| Wages | REC |  |  | REC |  |  | ILO  REC |  |  |  |  |
| Benefits |  |  |  | ILO |  |  | ILO  REC |  | REC |  |  |
| Health / Work Injuries | ILO |  |  |  |  |  |  |  |  |  |  |
| Documents (unstructured data) | OTH |  | OTH |  | OTH | OTH |  |  |  |  |  |

## Data Exchange Formats and Protocols

From the Data Exchange perspective, it is important to know, that the ILO solution allows for various data inputs and outputs. Therefore, an arbitrary system can easily be integrated to provide or consume data.

Following is the excerpt from the LMIS.Stat documentation on the data exchange topic:

.Stat comprises four main functions:

* **Data Entry:** The Data Provider Interface (DPI) is a web based application to process and load data into the Data Warehouse. Data can be in csv, .txt, .xml or sdmx format. In the coming .Stat Suite (Version 8, expected to be released in Q1-2019) this function will be accomplished by a new module called Data Lifecycle Manager (DLM)
* **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. The coming Version 8 will rely on SDMX based web services to interface with a number of re-usable web components for data visualization.
* **Data Analysis:** .Stat allows for the extracting of data to various analytical tools for further data analysis.

Obviously, the preferred format for data exchange is SDMX. SDMX (Statistical Data and Metadata eXchange) is a set of standards and guidelines aimed at facilitating the production, dissemination, retrieval and processing of statistical data and metadata. SDMX is sponsored by a wide range of public institutions including the UN, the IMF, the Worldbank, BIS, ILO, FAO, the OECD, the ECB, Eurostat, and a number of national statistics offices.

At its core, SDMX defines an information model consisting of a set of classes, their logical relations, and semantics. There are classes defining things like data sets, metadata sets, data and metadata structures, processes, organizations and their specific roles to name but a few. The information model is agnostic as to its implementation.



Figure 1 For better understanding of the reader, a sample SDMX definition in JSON format is provided. This definition does not come from the LMIS.Stat documentation and may differ from the actual implementation.

There are two implementations of the information model:

* **SDMXML is XML-based.** It is fully standardized and covers the complete information model. However, it is a bit heavy-weight and data providers are gradually shifting to the JSON flavor currently in the works.
* **SDMXJSON:** This recent JSON-based implementation is more lightweight and efficient. While standardization is in an advanced stage, structure-messages are not yet covered.

**The implications for the institutions integrating with the LMIS.Stat are:**

* **There is no need to modify the existing systems – practically any structured data from any SQL (or even object) database can be converted into SDMX.**
* **The LMIS.Stat accepts also other formats, like CSV/XML, however it may be reasonable to stick to SDMX for compatibility and know-how reuse.**
* **The integration should be standardized to a point, where connecting a new institution is more matter of configuration than of programming.**

## Accomodating New Indicators in LMIS.Stat

Another advantage of the LMIS.Stat system is that it can accommodate new indicators together with the required dimensions and it is only a matter of configuration. During the preparation of this document, we have contacted the ILO team with the following questions and they provided favourable answers:

1. **Is it possible in LMIS.Stat to define the new indicators?**

EG (ILO): Absolutely! There is no restriction for the definition of new indicators, which can be done by statistician (normally somebody taking the role of metadata manager, or data/metadata manager) without the intervention of an IT developer. There are only some good practices in data modelling that are suggested to be followed in order to harmonize the data concepts which facilitates comparison. A bad data modelling can also have a negative impact in the performance.

1. **Do these indicators have to be in line with SDMX definitions, or can you just define any indicator?**

EG (ILO): First, I can’t see any indicator that can’t be defined in SDMX. So it is not likely that SDMX restricts which indicators can or can’t be modeled. Again, it’s a matter of good practices, and following the SDMX information model is one of them. Besides, .Stat Suite uses SDMX for its inter-modules communications, so it is better if the datasets are modeled following SDMX information model principles. But as I said, this should not represent any limitation in terms of the indicators to be defined.

1. **Can you define arbitrary number of dimensions for each indicator? Do you have to fill them in if they are defined or they can be temporarily inactive (disabled so that you don't have to provide Cartesian product of the dimensions' data)?**

EG (ILO): Yes, although an excessive number of dimensions might be inefficient in terms of performance. “Empty cells” are allowed, but having very sparse data in a table is not a good approach, because it requires processing for keysets not representing any values. Furthermore, although the storage approach is that of a data warehouse, the characteristics of the statistical data and its heterogeneity in terms of data availability and multiplicity of sources, makes it impossible to model a single cube that could be able to accommodate all the tables like most of BI products would do. The approach in .Stat is based in multiple cubes (datasets) on top of which it is possible to have different “views” of the data conformed by “slices” of the cube which will have less dimensions and/or a shorter list of values (categories) for some of them. In that way you are “avoiding to fill” those “cells” that have no meaning in terms of data content. For example, “Employment level” for people below the working age (usually 15 y.o.).

1. **Can you define your own units for the indicators and dimensions?**

EG (ILO): Yes. The dimensions usually are pre-defined as it is a good practice to share the same structural metadata across the different datasets. That simplifies the administration and fosters comparability. Many dimensions are qualitative concepts, so they don’t have a “unit”. For example “Sex” refers to a characteristic of the individuals, but has no unit. However others may have, and whenever applicable, a dimension will have a unit (e.g. Age bands are expressed in years, Income ranges are in local currency or PPP) which is usually fixed with it. Otherwise data could not be mixed in the same table; I don’t see how you could mix in the same table income ranges expressed in different units, because they would not be comparable.

What usually we do have is a “Unit of measure” for the observation value, i.e. the measured phenomena. For example, the “Unemployment” can be expressed in “Persons” or in “Thousands of people”. The unit of measure is a concept that appears in the data model; a point to be resolved as part of the data modeling exercise is whether it should be a dimension or an attribute. A topic that we will eventually discuss.

**The implication for the CF LMIS is, that no separate database has to be built in order to accommodate new data of the indicator type. This introduces new opportunities for collecting other indicators – e.g. from ET-VET Monitoring and Evaluation System developed also under the SESIP Project.**

# LMIS Portal Linkages

This chapter contains information about LMIS portal linkages to NEES/MoL, AlManar, NAF database, etc.

It describes the technical aspects of the implementation of the ILO LMIS.Stat at the Ministry of Labour as the core solution, upon which the extensions covering the functionality described in detail in Conceptual Framework, can be built.

## Technological Architecture of the LMIS.Stat Solution and its Reusability

Following is the architecture of the LMIS.Stat solution (in its initial deployment without any extensions or modifications):

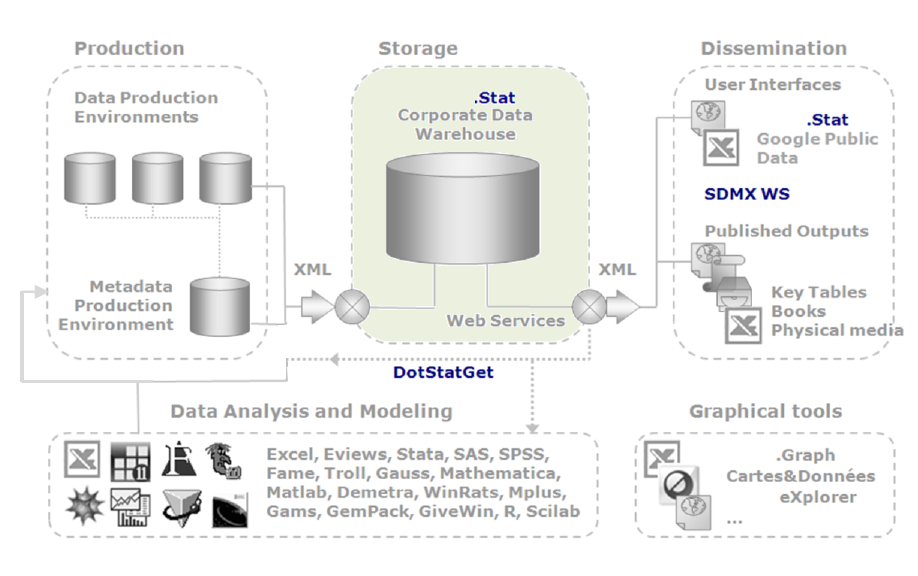


Figure 2 Central role of the LMIS.Stat Data Warehouse

Taking into account the requirements described in the LMIS Conceptual Framework, we assume following modifications/extensions of the solution to match the full feature set of the proposed solution CF LMIS:



The conclusion about the systems’s architecture is, that it is compatible with the future plans for CF LMIS. The remaining functionality of the CF LMIS compared to LMIS.Stat can be built atop the LMIS.Stat, using the same technologies and possibly reusing some of the libraries. The reuse of the code together with the reuse of the portal and document management technology must be further investigated.

## SW and HW Requirements

Following are the software and hardware requirements for the deployment of the solution:

**Internal Web application server:** This is the server for the administration of the platform, where the DPI (Data Provider Interface) and other utilities will run. It will normally be accessed from the intranet and by authenticated users only.

* HARDWARE:
  + Physical or virtualized server with 8 GB of RAM and 200 GB HD
* SOFTWARE:
  + Windows Server 2012 R2 (or above)
  + IIS (latest version for the OS, allowing ASP.NET v3.5 or above in IIS\Server\Web extensions)
  + Microsoft Message Queue (MSMQ), Microsoft WSE 3.0 (or above), IIS URL Rewrite 2.0 (or above), Microsoft Framework .Net 4.5

**External Web application server:** This is the server for the public to access the data. It will be accessible from the Internet by anonymous users.

* HARDWARE:
  + Physical or virtualized server with 8 GB of RAM and 200 GB HD
* SOFTWARE:
  + Windows Server 2012 R2 (or above)
  + IIS (latest version for the OS, allowing ASP.NET v3.5 or above in IIS\Server\Web extensions)
  + Microsoft Message Queue (MSMQ), Microsoft WSE 3.0 (or above), IIS URL Rewrite 2.0 (or above), Microsoft Framework .Net 4.5

**Database server:** This is the server where LMIS.Stat’s datawarehouse resides. It will be accessed by both the Internal (with R/W privileges) and External (RO) applications.

* HARDWARE:
  + Physical or virtualized server with 16 GB of RAM and 500 GB HD (depending on the amount of data, bigger capacity may be needed)
* SOFTWARE:
  + Windows Server 2012 R2 (or above)
  + SQL Server 2008 R2 Standard Edition (or above, up to 2014):
  + Components and features to install:
    - SQL Server database Services, Analysis Services, Client Components\Management Tools
    - Start SQL Server, SQL Browser services and SQL Agent
    - Authentication: mixed mode, Collation: SQL\_Latin1\_General\_CP1\_CI\_AS (Dictionary order, case-insensitive, for use with 1252 Character Set)

A Primary Domain Controller (PDC) is required for LMIS.Stat. It can be an existing one in the network where the servers are installed or a new one defined in a new server. It is recommended to use the Internal web server if one of the above-mentioned servers will take the role of PDC.

**The above-mentioned requirements are in our opinion justified, reasonable and allow for reuse of the technological stack for the later development of the custom components of the solution. The development environment – Visual Studio – is freely accessible and well-known to any renown SW development company. From the technological point of view, MoL can be sure about its investment. Furthermore – the solution might be soon portable (thanks to development of the open source technology .NET Core, which replaces Windows platform-bound .NET Framework) to Linux and other operating systems.**

**From the HW point of view, it is strongly advised to use the virtualization, because of the ever-changing/evolving nature of the solution and a complicated configurations/versions management, backup and recovery. Even if the server is provided as a donation, it should be capable of integrating with the existing MoL infrastructure (monitoring, backup, remote administration) and should be capable of virtualizing all the environments in question (test, staging, production).**

## Support, Maintenance and Upgrade Issues of the Solution

**Support:**

After the “go-live”, the Department of Statistics provides first level support as well as access to updates and ongoing enhancements.

**Modifications:**

TBC with Edgardo/ILO/Geneva

**Upgrades:**

TBC with Edgardo/ILO/Geneva

## LMIS.Stat Implementation Budget

The budget required for the implementation of the LMIS.Stat can be divided into two separate parts:

* Budget for the ILO support of the solution implementation (this part is not covered in this document and we be resolved separately between MoL and ILO; the estimated price for the initial support from ILO is based on the requirement of ILO to cover all HR related costs – travel and per diems, which adds to app. 25-30.000 EUR).
* Budget for the contracted company (or internal team) necessary to integrate the institutions providing the 30 KILM

The budget estimate is based on the following assumptions:

* For the implementation of the Data Exchange interfaces, a local company (or a company with local branch office charging prices similar to those below) will be contracted through a fair and open tender.
* Approximately 30 separate KILMs must be covered by the interfaces. The KILMs can be segregated by various metrics (age, sex, geography).
* Following pricing assumptions were made prior the budget estimation:



Following is the preliminary estimate of the budget required to support the implementation of the ILO solution locally:



Figure 3 Estimated budget for integration first institutions in order to exchange data for the 30 KILM indicators

This budget can be used together with the Terms of Reference, Conceptual Framework and Review of the Data sources to provide the tenderers with a comprehensive project dossier in order to receive the best possible proposals.

# Steps to Implement LMIS.Stat

## Solution Building

**Following is the list of minimum steps required for successful implementation of the solution:**

* .Stat configuration & installation to consultants (Geneva)
* .Stat configuration & installation to MoL staff (Amman)
* Labour market modelling and projections (Amman)
* .Stat data management & usage to consultant and MoL staff (Amman)
* .Stat data management & usage to countries’ staff (Webinars)
* Labour market indicators and sources to countries’ staff

# Risks and Their Mitigation

**In order to start the project and ensure its sustainability, following answers must be found:**

**Hardware:**

1. What infrastructure has to be purchased and where can ILO help?
2. Will the ILO donate the required server or will it donate financial resources for MoL to procure the server? How long will it take to purchase the necessary HW? Is it possible to start the implementation on the HW of MoL and then move (the virtual machines) to the new infrastructure?
3. What will be the configuration of the server and can ILO ensure it is compatible with the rest of MoL infrastructure (i.e. if the MoL is using certain supplier for its servers and use for example single monitoring tool/remote administration, can ILO provide compatible HW donation)?

**Project initiation:**

1. Is there really no requirement for the MoL to sign Memorandum of understanding? Is the MoL official letter enough? Will there be any contract signed later on? If yes, what such contract will include? Is any ILO template to give mol?
2. When are the next possible slots for ILO to start with the implementation (from May, realistically July 2019)?
3. Who will contract the local company - ILO or MoL? Who will pay costs for local company work? Is the financing in the future secured up to the estimation of 150.000 EUR in the future (one year)?
4. Will the local company work on the "time and material" basis or will there be any special ToR for this?
5. Is it a common understanding, that 5 heterogenous systems need to be integrated in order to provide 29 KILMs?

Besides that, following risks should be considered when running this projects and their mitigation is proposed in the right column:

|  |  |
| --- | --- |
| Risk source/main risk considerations | Risk mitigation |
| Customer (MoL/Government of Jordan) shelving the system for various reasons | A clear political support must be expressed for the implementation of the solution and its existence should be even supported by legislation |
| Solvency | The financial issues should be solved beforehand and the project financing should be secured at least for the first phase – LMIS.Stat implementation with all 29 indicators. The budget as stated above should be indicative for this phase and the fund raising and cash-flow should be setup accordingly. |
| Currency risk | The prices should preferably be quoted in EUR |
| Political instability / political relationships | Political support exceeding and election term should be seeked. |
| Non-contractual customer behaviour, lack of customer commitment/ other requirements from customer and participating institutions (e.g. timely supply of data) | Although the implementation process is started by the letter of intent, a clear agreement should be started before the actual implementation of the project. |
| Change in volume / service demand | The volume of the supply by ILO is beyond any reasonable doubts. However, the local company deployed to implement the interfaces should provide a clear evidence of understanding of the work to be done. |
|  |  |
| Suppliers / subcontractors / partners | In case the local company is subcontracting any company for critical tasks in the project, it must be clearly stated why and how the company mitigates the risk of breaking the partnership for any of the possible reasons. |
| Integration / dependency on third-party products and/or partners (participating institutions) | This project is an integration effort on several sides and should therefore be considered as risky per se, with all the possible things that can go wrong in this type of project. |
| Delivery date commitments (unsecured) | Even though the delivery date is not critical (e.g. not stated by legislation), it should not be underestimated. The long lasting projects usually spiral into void. |
| Inadequate of back-to-back agreements | As stated by ILO, back-to-back agreements (institutional arrangements) are vital to the project success. On the side of supplier (local company), a b2b agreement should be signed to have the same interest in mitigating the risks. |
|  |  |
| Legal scope and conditions | To be explored as part of the analysis of the project. |
| Unforeseen changes in legal and fiscal conditions | N/A |
| Product liability | The product in question, LMIS.Stat is backed up by reasonable number of references and a strong team. |
| Data protection requirements | To be explored as part of the analysis of the project. |
| Confidentiality requirements | To be explored as part of the analysis of the project. |
| Patent/ license/data ownership infringements | To be resolved between ILO and MoL, including further development of the solution. |
| Violations of national legislation and culture | To be explored as part of the analysis of the project. |
|  |  |
| Contract / profitability | This project is not intended to generate profit on either side, however it should be kept within reasonable financial framework for all the involved parties. |
| Critical delivery date commitments with significant consequences if not met | As explained above. |
| Critical service commitments (reliability, performance, availability...) | To be agreed and published as MoL’s SLA to the users. |
| Inadequate provision for business process changes | N/A |
| Inadequate business process reengineering | Although not direct need for business process reengineering is expressed in this phase of the project, it may happen, that certain business processes at the institutions may be modified and enhanced. This should be clearly stated in the institutional agreement documents. |
| Liability for losses due to delay, warranty, other legal provisions | To be covered by the contracts/agreements between distinct parties. |
| Inadequacy of acceptance procedures |  |
| Agreements on extending scope of contract, contract renewal/ termination |  |
| Inadequate change request process/ claim management |  |
| Unusually long warranty period (HW > 3 yrs; SW > 12 mon.) | N/A, warranty to be clarified between MoL and ILO and MoL and local company |
| Long-term service commitments | N/A |
| Critical Service Level Agreements | N/A |
|  |  |
| Technical |  |
| Use of new technology/ new solutions | The technologies are well known in the proposed solution, however the version of the product should be chosen wisely to be future proof and error-free (at the moment, the version 8.0 ). |
| Architecture not in line with recommended in this document/MoL requirements/good practice | The architecture of the LMIS.Stat is modern, service oriented, based on proven technologies and standards. |
| Technologies and development framework not in line with this document/MoL requirements/good practice | N/A |
| Use of unauthorized products and components | All the licences must be purchased prior the deployment in accordance with the licencing model. |
| High number of products / components / interfaces to be integrated | N/A |
| Large proportion of customer-specific product development / customizing | N/A |
| Specific IT security requirements (e.g. military/border control/health) | N/A |
| Compliance with current national and international norms and standards | MoL has to assure, that the indicators, dimensions etc. are configured in line with the national and international standards. With the help of ILO. |
|  |  |
| Project process / project organization / personnel | The proper personnel must be ensured prior the project and a timely cooperation must be ensured especially because of a limited time of ILO consultants on site. |
| ISO compliant or comparable project management methods and tools not used | To be ensured by the contracting authority – MoL. |
| Skills / experience of project staff | The project requires various IT professions in place from all the involved parties. A proper mix must be ensured and contracted. |
| Lack of resources key positions (PM, SA, QM, CM) / availability of project personnel | A clearly named roles and names must be ensured for each position. |
| Dependency on key personnel (own/ customer`s/sub-contractors) | Of all the key persons in the project, the ILO implementation experts and MoL management are probably the most irreplaceable. A special attention must be paid in order to ensure their availability and continuity. |
| Lack of stability in project organization, including Steering Committee | The organization of the project is described in Conceptual Framework and should be followed upon. |
| High number of partners / communications obstacles (language, heterogeneous project culture) | This project will involve number of institutions – partners, of which 3 are crucial for the project implementation – ILO, MoL and local company, the rest of the partners is responsible for partial results of the project, though very important. |
|  |  |
| Infrastructure / logistics | The MoL must ensure timely build of the infrastructure as foreseen in Conceptual Framework and ILO documents. The time for purchasing the infrastructure should be clearly indicated in the project plan and a necessary reserve should be kept for possible glitches in the infrastructure procurement and setup. |
| local infrastructure / communications infrastructure | As above, including the dependency on the internal infrastructure team of MoL. |
| Procurement/ purchasing/ scheduling/ logistics | The procurement should be done in a timely fashion as described in the Conceptual Framework. |
| Loss of assets/ damage in transit | N/A |

# List of Annexes

The following documents were collected and used during the preparation of the Conceptual Framework:

|  |  |  |
| --- | --- | --- |
| N | Document | Author(s) |
|  | TA JO LMIS - Review of the IT Systems integrated with LMIS | Ivan Majerčák, Mohammad Ismail, Luba Pavlovova |
|  | TA JO LMIS - Conceptual Framework | Ivan Majerčák, Mohammad Ismail, Luba Pavlovova |
|  | TA JO LMIS – Terms of Reference | Ivan Majerčák, Mohammad Ismail, Luba Pavlovova |