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## NEW APPROACHES TO STATISTICAL DATA EXCHANGE

**Abstract:** The article is devoted to the development of the SDMX standard in international statistical practice. SDMX - (Statistical Data and Metadata Exchange Initiative) problem and exchange of statistical data. In particular, the issues of electronic exchange of statistical data, which are widely used by EUROSTAT, IMF, BIS, ECB, are considered. SDMX very important for the official international statistical organizations.

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### Introduction

SDMX is an international standard for Data and Metadata exchange, which corresponds to the approved ISO standard (17369:2013), designed to ensure effective exchange of statistical data and metadata and facilitate their dissemination among national and international statistical organizations. Standardization within the format is achieved through the use of approved lists of codes and descriptions of statistical data structures and metadata. In the case of the European Statistical System (ESS), this is an exchange between the Statistical Office of the European Union (Eurostat) and the national statistical offices of the EU member States.

However, SDMX is currently also used by organizations outside the world of official statistics. The SDMX format may be of interest to any organization that collects, processes, analyzes and distributes statistical data and metadata.

As is known, in international practice, the most common are two options for using SDMX [1-3]:

- SDMX as a format for reporting and collecting reports, like SDMX-EDI.
- Dissemination of statistical data through websites.

The SDMX standard defines formats for the exchange of aggregated statistical and metadata data and is used as a method of collecting and processing statistical information to improve its quality, and at the same time it is necessary to use uniform identifiers of individual objects of statistical accounting. The main purpose of this standard is to simplify the exchange of statistical data between organizations.

This standard not only makes it easier to access statistical data, but also makes it more accessible for use in statistical organizations with the help of data metadata.

The SDMX standard contains components like [3-7]:

- information model (Information Model);
- XSD-structure description schemes;
- content models and data types;
- Content-oriented Guidelines - a set of programs and tools for working with SDMX. Standardization of statistical information in SDMX simplifies data analysis and their dissemination between organizations.

The use of web services makes it possible to simplify the processing of arrays of information and ensure the connection of adjacent systems, providing

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any user with the opportunity to obtain and compare the macroeconomic indicators of interest to him.

The advantages of the SDMX standard are at the heart of an interdepartmental project currently being implemented in the EU and Russia to introduce the standard into the practice of distributing statistical data, both as part of information exchange with international organizations and as part of providing data to an unlimited number of users using portal technologies.

The results of the work are recommendations on the use of individual elements of the information infrastructure for the collection and analysis of statistical data. In the existing information infrastructure of the digital economy, there are a number of information sources, the use of which contributes to improving the quality of statistical data collection and processing. Standards for the exchange of statistical and metadata data as SDMX (Statistical Data and Metadata eXchange), which facilitates their exchange using modern information technologies.

With the development of the first SDMX standard, a number of other projects are being carried out aimed at supporting and developing new electronic standards for data exchange. SDMX projects are aimed at using new Internet technologies and the experience of those who deal with business requirements and IT support for the collection, compilation and dissemination of statistical information.

Currently, four projects are being carried out within the framework of the SDMX organization: practical research of new electronic data exchange standards; batch data exchange; development and support of the "Common Statistical Protocol for Time Series - Version 3.0", creation of a common dictionary of data metadata and development of a standard approach for creating and using data metadata repositories.

The SDMX system is aimed at defining information standards (concepts and definitions, classifications and nomenclatures, indicators, measurement methods, information quality criteria) for representing social, economic, environmental, technological and other phenomena and processes for all infrastructural information systems [7-11].

At the same time, special attention is paid to the information systems of central and regional government bodies, for the effective dissemination of statistical information between countries due to its universalism. Official statistics cover all spheres of social and economic life of society, technological and environmental phenomena and processes.

That is why official statistics, especially the national statistical Service (Government statistical organizations, regional offices) should play a coordinating role by developing information standards for use by other stakeholders of the country's information infrastructure.

SDMX message formats have two main types: SDMX-ML (using XML syntax) and SDMX-EDI (using EDIFACT syntax and based on the GESMES/TS statistical message).

The standards also include additional specifications (e.g. registry specification, web services). As you know, version 1.0 of the SDMX standard was recognized as an ISO standard in 2005. The standard provides for the transfer of both data and metadata.

At the same time, two types of data metadata are distinguished: structural and reference. Structural metadata data acts as identifiers and descriptors (for example, variables, code lists, data sets) and is necessary for defining data (name of a dynamic series, time interval and unit of measurement).

Reference metadata includes such data as: "conceptual" (the concepts used and their practical implementation; "methodological" (describe the methods used to produce statistical data); "qualitative" (various measurements of the quality of the statistical data obtained).

As our analysis has shown, the description of the data structure (DSD) includes three main components: measurement attributes (dimensions) that describe statistical data and form their identifier (key) to the corresponding data (for example, time, area, gender); values (measures) that reflect the value of a statistical quantity over a period of time; attributes (attributes) additional information about any part of the data set under consideration that may characterize a data set, an observation, or a group of measurements [1-13].

The general mechanism for organizing data exchange in accordance with SDMX is as follows:

- determination of data to be transmitted (within the framework of the standard, data is distributed across the main thematic areas of statistics (statistical domains):
  - demographic and social statistics, economic statistics, environmental and multisectoral statistics);
  - definition of the conceptual data transmission scheme;
  - creating a list of codes;
  - creation of special data structures (DSD) and metadata (MSD);
  - formation of data flows, including metadata;
  - creating links between national data and DSD;
- creating a data set;
- setting up the mapping process;
- formation of data in SDMX format.

The toolkit that allows data transmission in accordance with the standard consists of:

-DSD Constructor (an application capable of converting and editing frequently used metadata formats into SDMX-ML formats. Includes an interface that allows you to create DSDS and edit data according to requirements.

- Fusion Registry (fully integrated SDMX data and metadata management system, providing the

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creation of structural metadata, reference data metadata, data collection, validation and transformation and dissemination.

- SDMX Converter
- SDMX converter that converts statistical data sets into a file that meets the requirements of SDMX
- Stat Suite is an open source platform that provides the dissemination of statistical data.

This data is guided by the Standard Statistical Information Model (GSBPM) and SDMX. The program to create a modern, ICT-based information infrastructure of the country contributes to the development of official statistics. This program should play an important role in the country's information infrastructure through the use of information standards.

The possibility of integrating SDMX methodological approaches into the Big Data architecture was noted by developers at the stage of creating its first project. SDMX can be identified by its values, a specified control date, and attached attributes.

Currently, work is underway aimed at simplifying and improving the data reference metadata model;

- supporting microdata; supporting geospatial data;
- supporting code list expansion and disjunction code list aggregation; improving structure mapping;

- improving code hierarchies for data discovery;
- improving restrictions on structural data metadata artifacts, REST web services application programming interface, and improvement and simplification of metadata data exchange formats [12].

Standardization of statistical information within the SDMX standard significantly simplifies the dissemination and analysis of data. The use of web services makes it possible to simplify the processing of arrays of information and ensure the connection of related systems, providing any user with the opportunity to obtain and compare macroeconomic indicators of interest to him in different countries of the world.

These advantages of the SDMX standard form the basis of projects currently being implemented in a number of countries to introduce the standard into the practice of statistical data dissemination.

Prospects for the development of the SDMX standard in international statistical practice. In 2019, the European Central Bank launched a project to create a platform that should replace the macroeconomic statistics information system that has been in place for more than 26 years. The system being developed is focused on big data processing, and the technological stack of Hadoop software products was chosen as the basis for creating the platform.

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