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STATISTICAL INFORMATION SYSTEM OF THE REPUBLIC OF BELARUS: EXPERIENCE AND PERSPECTIVES

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ABSTRACT

Making optimal decisions in the context of economic integration with the European Union requires a creation of the harmonized information system within the framework of the Eastern Partnership.

Therefore, the official statistics plays a more important role in questions related to improvement of statistical methodology, establishment of information resources, development and implementation of the common standards of statistical data provision and sharing. It is evident that such an information system must be created with consideration for capacities of national statistical systems of the Eastern Partnership member countries.

Presently, the cooperation between the National Statistical Committee of the Republic of Belarus and the Statistical Office of the European Communities has become fairly stable. The Belstat regularly provides the statistics on the following topics: foreign trade, demographics and annual data reflecting socio-economic development of the country (Eurostat questionnaire for countries with economies in transition). The global assessment of Belarusian statistics, carried out in 2007 by Eurostat, showed that Belarus has a comprehensive, consistent, and well established statistical information system which includes all statistical domains allowing for provision of comparable data in most areas.

One of the possible directions for developing the information sharing and creation of the harmonized information system is the use of SDMX international standards (sharing of statistical data and metadata) which are used in the European Statistical System and define a general information model, technical specifications and formats of structured aggregated statistical data and metadata.

Today, within the framework of the State Programme of Creation of the Integrated Information System of State Statistics of the Republic of Belarus, organizational and technical solutions designed to maintain a common metadatabase and a summary information database are under development, with XML format used for data presentation.

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Based on Eurostat's experience of development and implementation of standards, the creation of the harmonized information system within the European Partnership must include stages for analysis of national information systems, employed approaches to metadata structure description, definition of techniques for data conversion in order to meet requirements of technical part of the standard, development of appropriate software for conversion.

It is evident that the creation of the harmonized information system within the framework of the Eastern Partnership, first of all, requires a detailed coordination between statistical offices of the programme's member countries.

Introduction

The initiative for extending cooperation between the European Union with its Post-Soviet eastern neighbours was officially formalised in May 2009 in the declaration adopted by 27 EU member states and Azerbaijan, Armenia, the Republic of Belarus, Georgia, the Republic of Moldova and Ukraine. The declaration defines the Eastern Partnership as measures assumed by the partner countries, based on common interests and mutual commitments as well as on shared ownership and responsibility. The paramount goal of the Eastern Partnership is to create the necessary conditions to accelerate political association and economic integration between the European Union and partner countries and to extend bilateral and multilateral cooperation.

In order to enhance economic integration, the main directions are the extension of trade and investment activity, establishment of free trade areas, development of small and medium sized business ("Economic integration and convergence with EU sectoral policies"), strengthening of energy security, conduction of energy saving and energy efficiency projects ("Energy security").

Certainly, the enhancement of integration and development of these directions require an appropriate information support while the established information resources must be credible and available to general public. In this connection, the vital task is to create a harmonised information system allowing to obtain and efficiently use the data and to support decision making in the context of economic integration of the partner countries with the EU.

To solve this task, the official statistics should focus on such areas of activity as:

- creation of a methodologically coherent and credible information resource on the socio-economic development of the country;
- support of standards on description, dissemination and exchange of summary statistical data.

Therefore, the role of national statistical agencies increases in matters of updating the statistical methodology, extending an information base and providing the necessary level of detail when establishing information resources, developing and implementing the common standards for statistical data presentation and exchange. It is evident that a harmonised information system is

to be created with due consideration for capacities of national statistical systems of the Eastern Partnership countries.

A possible direction for further development of the information exchange and creation of the harmonised information system is the use of international SDMX standards (statistical data and metadata exchange) which are implemented in the European Statistical System and define the general information model, technical specifications and formats of aggregated statistical data and metadata.

1. Information cooperation of the National Statistical Committee of the Republic of Belarus with the European Union and the Eastern Partnership countries.

When speaking of cooperation with statistical agencies of the Eastern Partnership countries, it is important to note a well organised system of statistical information exchange within the framework of the Interstate Statistical Committee of the Commonwealth of Independent States. The CIS member countries provide information to the Interstate Statistical Committee of the CIS according to the Programme of Work, subject to annual review and approval by statistical agencies of the CIS countries. Presently, information on the following topics is provided to the Interstate Statistical Committee of the CIS:

- main macroeconomic indicators and financial activity;
- foreign economic activities;
- main indicators of the real economy (including industry, agriculture, construction, transport and communications, trade and paid services);
- institutional reforms in the economy;
- demographic statistics;
- labour and living standards statistics;
- environmental statistics; etc.

In addition, the Belstat closely interacts with statistical agencies of the CIS countries under current bilateral agreements on statistical cooperation. This type of cooperation allows the Belstat to receive up-to-date information on the socio-economic development of the CIS countries as well as to conduct comparative analysis in such fields as foreign trade statistics, industrial and price statistics, etc.

Lately, the cooperation between the National Statistical Committee of the Republic of Belarus and the Statistical Office of the European Communities has become fairly stable. The Belstat regularly provides the statistics on the following topics: foreign trade, demographics and the annual data reflecting the socio-economic development of the country (Eurostat questionnaire for countries with economies in transition). The global assessment of Belarusian statistics, carried out in 2007 by Eurostat, showed that Belarus has a comprehensive, consistent and well organised statistical information system which includes all statistical domains allowing to provide comparable data in most areas.

I would like to focus on the interaction between statistical agencies of the Republic of Belarus and the Republic of Poland within the initiatives of the

European Partnership. As a part of extension of cross-border cooperation and presentation of the information reflecting the socio-economic development of cross-border territories, statistical booklets "Grodno region and Podlaskie Voivodeship in 2008" and "Grodno and Bialystok in 2009" were published in 2010 and 2011, respectively. A statistical publication "Neman Euroregion" is planned for release.

It is evident that today a development strategy for an information system must cover all spheres of statistical activities, set priorities and directions for enhancement. Its implementation must be based on the statistics development programme in order to achieve goals and actual results including ensuring high quality data and the use of best international practices as well as to consider user needs at all levels and serve as a coherent base for extending partnership relations.

2. Potential for implementation of the SDMX standards by the national statistical agency of the Republic of Belarus.

2.1 General characteristics of approaches to the SDMX standards: methodological and technical aspects.

The International Statistical Data and Metadata eXchange (SDMX) standard is an initiative that was started in 2001 by seven international organisations, among which were the statistical office of the European Union (Eurostat) and the United Nations Statistical Division. These standards define, first of all, guiding principles and formats for data and metadata exchange.

The SDMX standards contain two major components: statistical (content-oriented, based on a common information model) and technical (defining formats and syntax, data exchange procedures).

Approval of the SDMX Technical Standards version 2.0 by international organisations in 2005, their recognition as the preferred standard for data and metadata exchange by the United Nations Security Council in 2008, active use of standardised network services to integrate the existing and to create new resources of statistical organisations as well as further development and implementation of the standards (creation of SDMX Working Groups with global participation for technical and statistical aspects of the standards and release of SDMX Technical Standard version 2.1 in 2011) make it possible to consider them as the most perspective tool for creation of a harmonised information system.

Today, the Eurostat information system is based on the SDMX meaning that description rules and metadata structure based on the use of hierarchical codes and classifications are highly universal. The Euro SDMX Metadata Structure published in March 2009 uses twenty one high-level concepts allowing not only to describe statistical characteristics of data (such as the information on metadata update, classifications used, users of information, territory and survey period, measurement units, accuracy, reliability, validity, comparability) but also to reflect characteristics of the statistical process of data collection, costs and respondent burden, policies of confidentiality, data dissemination and quality control. This approach has a high redundancy and interoperability (an ability for

the system to operate without limitations) enabling integration of the systems of different owners. While the main emphasis in the standards is placed on definition of formats for structured aggregate statistical data presented in time series, cross-sectional data formats are also supported. SDMX technical specifications are based on XML format, widely used today in various spheres.

The results of the SDMX Global Conference held on May 2-4, 2011 in Washington, DC show that more than 80% of organisations are already using or planning to start using these standards. The Belstat also took part in the online survey on acceptance level, challenges and perspectives of the SDMX standards for the purposes of official statistics.

The perspectives of the SDMX standards in international exchange are obvious; however, their use in the national statistical system of the Republic of Belarus and for inter-departmental exchange is limited due to heavy centralisation of the Belarusian system. Therefore, one of the key tasks will be the development of the corresponding software and interfaces allowing for conversion of the existing and developed national bases and their integration with additional information sources to support an automated data exchange with other information systems, e.g. the European Statistical System.

2.2. Approaches to metadata description in the Integrated Information System of State Statistics

Development of a new generation information system is currently under way in Belarusian statistics. Quality changes in approaches to the statistical information system are implemented within the framework of the State Programme of Creation of the Integrated Information System of State Statistics (IISSS), endorsed and approved by the President of the Republic of Belarus.

The State Programme stipulates activities to implement brand new approaches to automate processes of organisation and maintenance of state statistics, i.e. collection, processing, aggregation of raw statistical data; accumulation, storage and protection of statistical information; dissemination of summary statistical data, and is aimed to create an integrated statistical information resource and a set of software and hardware tools and technologies enabling adoption of a common state statistics policy. Within the framework of the Programme developed are organisational and technical solutions for maintenance of a unified metadatabase and summary information databases with XML used as a format for data presentation.

IISSS software components are based on an Oracle Database Management System, involve the development of novel technologies and comprise 5 main subsystems:

a subsystem for metadatabase management with the following key elements:

- a statistical register,
- a catalogue of statistical indicator,
- common statistical classifications and references based on national classifications.

a subsystem for collection and processing of raw statistical data containing**:**

- tools for creation of uniform template forms for state statistical observations,
- tools for collection and processing of raw data in electronic form.

a subsystem for accumulation and storage of statistical information allowing for management of long-term databases:

- generation of predefined and customizable tables;
- database export for further analytical processing, including external information systems.

a subsystem for analysis and dissemination of statistical information, which includes management of a finished document database and a corporate Web system, data visualization tools.

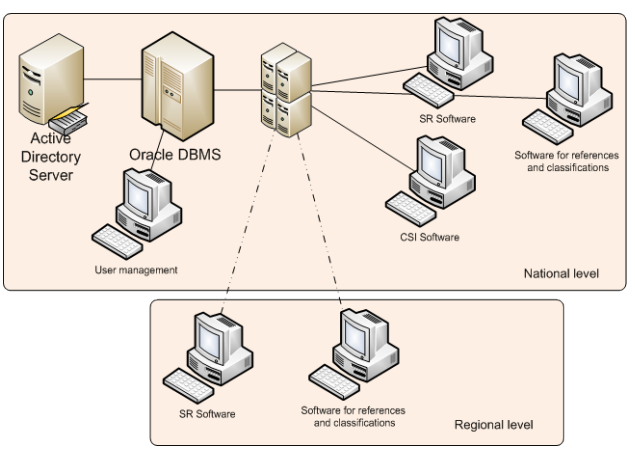
an information security subsystem, required for cryptographic protection of transmitted information and serving for the purposes of the state system of public key management, currently under development in the Republic of Belarus, which allows for using the same key to set up a full legally relevant workflow between organisations and state bodies.

A metadatabase is a methodological basis for achieving consistency of data formation principles. A common metadatabase is a tool for methodological coordination of statistical observations allowing to implement principles of integrated statistics.

A metadatabase management subsystem serves for formation and management of metadata used for collection and processing of statistical data at three levels: district, regional and national.

The joint creation and management of the information between different territorial levels are carried out within the Integrated Republican DBMS taking into account interaction of multiple statistical authorities.

A simplified diagram of the interaction is presented below:



Software tools of a metadatabase management subsystem are used for the following tasks:

management of a statistical register;

management of a metadatabase for the catalogue of statistical indicators;

management of a common system of IISSS statistical classifications and references.

Software tools for managing statistical register are designed for registration of statistical observation units and preparation of statistical observation unit list to conduct an observation.

Software tools for managing reference data are designed for centralised management of classification and references used for achieving information integrity of all IISSS subsystems.

Software tools for managing the catalogue of statistical indicators are designed to create and manage a list of indicators upon which an aggregate database (macro data) is compiled.

The catalogue of statistical indicators is a system of metainformation about indicators used in statistical practice and aiming to solve the tasks of:

- formalised description of statistical indicators;
- identifying the values of statistical indicators;
- systematisation of indicators and description of inter-linkages between them;
- search and presentation of reference information on indicators.

Development of the IISSS metadatabase catalogue of statistical indicators employs the following principles for description of indicators within the common methodology of defining an indicator base and its attributive component:

each indicator contains the base reflecting the essence and general distinguishing features of socio-economic phenomena without specifying the place, time and numerical value;

the base must be unambiguous and is characterised by attributes (each base has its own set of attributes from a general range);

hierarchical coding, sensitive to the indicator class, objects under observation, class and base qualifiers, is used for structuring (classification and rubrication);

each indicator is provided with a tutorial containing methodical (methodological) explanations in a text format and a changelog.

In case of macro data the base and attribute of an indicator are assigned with periods and breakdowns (e.g. territorial, by kind of economic activity, etc.) as well as measurement units and directly the indicator value.

The multiple indicator rubrication offers great possibilities facilitating the search of the indicator in question and related meta information allowing for

further export of indicator values for various periods and in the required breakdown from a macro database.

It is worth noting that the principles, implemented in the subsystem for managing the IISSS metadatabase, in general comply with the approaches used in the SDMX standards, however, a wider, full-scale application requires additional works in terms of creation of metadata structure description (e.g. quality management, confidentiality and data dissemination policies, user satisfaction) and development of the required software and hardware tools for integration with information systems of international organisations and national statistical agencies.

2.3. Major challenges to the implementation of the SDMX standards on the way to create a harmonised information system

The programme for establishment of the harmonised information system within the framework of the Eastern Partnership must include stages of analysis of national information systems, approaches used to describe metadata structure, identification of techniques to convert data to meet the requirements of statistical and technical parts of the standards, possibly, creation of special (localised) version of the standard to minimize an impact on internal structures of national statistical agencies, development of relevant software to convert the existing data.

Different approaches of national statistical agencies to the SDMX standards can be viewed as one of the main challenges. Despite overall support (according to the results of the 2011 Global Survey which covered 124 organisations representing six continents), over 10% of the organisations do not plan to use the standard while 50% are not currently using the standard but are planning to implement it in the future. The transition to the standard is slowed by the lack of resources, both financial and human, which is aggravated by the world financial crisis.

The Republic of Belarus is planning to start implementing international standards to set up an exchange of the information with international organisations. Apart from the issues related to the lack of human resources and level of personnel training, necessary technical support, lack of financial resources, which are common among national statistical agencies, we also have to solve the organisational problems of the existing databases, overcome the constraints related to dissemination of the summary information, and fix compatibility issues in order to meet the requirements for data protection.

Eurostat's experience in the development and implementation of the SDMX standards at international level will be of tremendous help to all Eastern Partnership countries.

It is also essential to choose a direction related to the development and further elaboration of harmonised definitions of data and metadata structure. Moreover, it is reasonable to discuss the establishment of a local group consisting of the partner countries to develop common approaches to metadata structure and localized definitions.

It is evident that, in the context of developing the information society and focusing on the use of information resources in management and decision support systems, provision of electronic services, the official statistics must progress by extending the range of information resources and services provided while increasing their quality and ensuring the interaction with information systems of international statistical agencies and organisations. The technological basis for implementing this strategy is the use of web technologies and groupware applications.

Production and wider distribution of an open source and free software as well as an in-depth study of the SDMX potential to be harmonised with other statistical standards can be identified as actual needs of statistical agencies for development and implementation of the SDMX standards.

Conclusions and suggestions

Today, when countries are integrating their economic systems, the immediate issue is to establish a multilateral public information resource on the socio-economic development of the territories and economic relations.

Considering this, the official statistics should tackle the tasks of forming methodologically harmonised and accurate information as well as supporting the standards of description, presentation and exchange of statistical data.

It is evident that the creation of a harmonised information system within the framework of the Eastern Partnership, first of all, requires a detailed coordination between statistical offices of the partner countries.

Implementation of the SDMX standards can be suggested as one of the mechanisms to create a harmonised information system.

It is necessary to study the desire and willingness of the official statistical agencies to use international standards, to make an adequate assessment of the existing methodological and technical challenges and advantages. It is evident that such a transition will be long-term requiring additional expenditures.

Eurostat's experience in the development and implementation of the SDMX standards as well as a more active participation in international workgroups, production and wider distribution of web-oriented free software will be of tremendous help to all participating countries in order to create a joint information resource and harmonised information system.