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**METAINFORMATION COMPONENTS OF THE CLASSIFIER
OF ECONOMIC INDICATORS IN INFORMATION SYSTEMS**

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**МЕТАІНФОРМАЦІЙНІ СКЛАДОВІ ПІДТРИМКИ
КЛАСИФІКАТОРА ЕКОНОМІЧНИХ ПОКАЗНИКІВ
У ІНФОРМАЦІЙНИХ СИСТЕМАХ**

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**МЕТАИНФОРМАЦИОННЫЕ СОСТАВЛЯЮЩИЕ ПОДДЕРЖКИ
КЛАССИФИКАТОРА ЭКОНОМИЧЕСКИХ ПОКАЗАТЕЛЕЙ
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Use of "big data" and data store room in analytical investigations requires review of the approaches to forming meta-information description of economic indexes to submit them to the users of comprehensive information concerning these indexes and opportunity to evaluate their quality. Within the article, considering providing the data quality, the hierarchy structure and content of meta-information environment of the economic data Classifier, its main functions and measures on preparing its forming are defined, content of the main information objects to support descriptions of economic indexes is considered, as well individual problem aspects that are necessary to be considered by practical implementing are lightened. Of metainformational environment is offered within the article that shall provide creation of comprehensive information concerning the data of analytical researches and will be useful by forming repository of metadata, data store room, informational portal.

Key words: "big data"; classifier of economic indicator; meta-information; repository of the metadata; data store room; data quality.

Fig.: 1. Bibl.: 8.

Використання «великих даних» та сховищ даних в аналітичних дослідженнях вимагає перегляду підходів до формування метайнформаційного опису економічних показників для надання користувачам всеохоплюючої інформації щодо цих показників та можливості оцінки їхньої якості. У статті з погляду забезпечення якості даних визначено ієрархічну структуру та склад метайнформаційного середовища Класифікатора економічних показників, його основні функції та заходи з підготовки його створення, розглянуто склад основних інформаційних об'єктів для підтримки описів економічних показників, а також висвітлено окремі проблемні аспекти, які потрібно враховувати у процесі практичної реалізації. Запропонована у статті структура метайнформаційного середовища забезпечить формування всебічної інформації щодо даних для аналітичних досліджень та буде корисною при створенні репозитарію метаданих, сховища даних, інформаційного порталу.

Ключові слова: «великі дані»; класифікатор економічних показників; метайнформація; репозитарій метаданих; сховища даних; якість даних.

Рис.: 1. Бібл.: 8.

Использование «больших данных» и хранилищ данных в аналитических исследованиях требует пересмотра подходов к формированию метайнформационного описания экономических показателей для предоставления пользователям всеохватывающей информации об этих показателях и возможности оценки их качества. В статье с точки зрения обеспечения качества данных определена иерархическая структура и состав метайнформационной среды Классификатора экономических показателей, ее основные функции и мероприятия по подготовке к ее созданию, а также освещены отдельные проблемные аспекты, которые необходимо учитывать при практической реализации. Предложенная в статье структура метайнформационной среды обеспечит формирование всесторонней информации о данных для аналитических исследований и будет полезной при создании репозитария метаданных, хранилища данных, информационного портала.

Ключевые слова: «большие данные»; качество данных; классификатор экономических показателей; метайнформация; репозитарий метаданных; хранилище данных.

Рис.: 1. Библ.: 8.

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Problem setting. Addressing to "big data" (hereinafter – BD) as for compulsory source of information with the purpose of deepening analytical researches and using for them data warehouse (DW) as aggregated information resource comprising consolidated information from all problematic sphere, requires reviewing the approaches to creating meta-information concerning economic indicators (hereinafter – indicators) for it further submitting to the users that will be able on its base evaluate data quality. BD are considered as data that are characterized by very big amount, high speed of their accumulating and variability, that require efficient and consumable innovative methods of processing, and are used as additional to traditional sources of information (statistic or administrative data, data of own production systems)

and are received from open data sources, for instance such social data sources “Twitter”, “Facebook” and others) and searching engines (search in the Internet, reviewing web sites). BD comprise new information, facts and interrelations that were not possible to research before by practical means. Integration of indicators and identifiers received from this information for DW with the purpose of creation high quality products shall require deep details of data context to compare such indexes and indicators with the results received by using target methods of information collecting. Metadata concerning consolidated in DW information should give opportunity to evaluate the level of completeness, integrity, consistency and adequacy of the received from it information model of problematic sphere with the purpose of efficient use by analytical researches. For their unambiguous definition, coding in the documents (reports, publications and others) and IS objects (files, data base tables and others), information exchange, the Classifier of economic indicators (hereinafter – CEI) has got an important role.

The core of modern information system (hereinafter – IS), targeted for conducting grounded and comprehensive social and economic research of the society state, usually data fund is accepted, in which indicators are coordinated under CEI. Data integration out of various types of information resources complicates the work with CEI implementing, since the same indicators in various sources can be named in different ways, and various indicators can have the same names. To solve efficiently the problem with providing IS functioning, submitting for the users access to clear comprehensive information concerning the indicators and opportunity to evaluate their quality, an important role is played by creating detailed metadata referring indicators content as information environment of CEI (hereinafter – MIE of CEI) as a complex of information objects (hereinafter – IO), that are usually comprised in metadata repository (hereinafter – MDR). With this purpose, it is necessary to define structure and content of MIE of CEI addressing to the experience of international statistics, in particular, to use of the type model of statistic information (Generic Statistical Information Model, hereinafter – GSIM) [1], under the specification of which [2], it is possible to determine main requirements to meta-information which is necessary for the user and IS functioning considering methods of information technologies implementing (hereinafter – TI).

Analysis of the recent researches and publications. There is a detailed report in the Specification GSIM [2] of principles of informational environment creation, as analogue to MIE of CEI, that are used in production organized by definite process scheme, under which the classifiers are considered in interaction with other IO, participating in implementing process components (hereinafter – PC) of this scheme. National statistic organizations (hereinafter – NSO) have significant experience of implementing and using these environment. Their infrastructure of supporting in various NSO is grounded on active IS that have their own historic specifics, and, correspondingly, problematics of the development of meta-informational components such as IS in different countries has as well its peculiarities, that should be considered by elaborating own decisions. Considering the issues connected with forming MIE of CEI, it is feasible to analyze and take into consideration experience of D.W. Gillman [3], point of view of M. Scanu and C. Casagrande [4], M. Eriksson [5], specialists of the Statistic Bureau of Sweden (hereinafter – SBS) [6] and NSO of Slovenia [7], and providing quality control by means of MIE of CEI using – relevant manual of the European Statistical System [8].

D.W. Gillman [3] offers the approaches to standardization of the term system considering increasing efficiency of search engines in IS and on the web sites, defining on the base of conducted taxonomic analysis group of characteristics under which the user can make search of the statistic indicators.

M.Scanu and C.Casagrande [4] consider advantages in using IS in standard of GSIM concerning description and access providing to the classifiers and variables. Herewith, they study variables as an association between integrity unit and concepts connected with these characteristics complex. As well in [4], there is a conclusion concerning some classifiers versions

and samples of used algorithms of connecting in the IS inquired by the user micro and macro data with reference metadata. Data context is researched in connection with statistic program, process method, PC as a process step, input information and the results of PC performing.

M.Eriksson in [5] considers applied aspects of implementing searching functions to receive statistic data and providing with metadata that allow to study and harmonize received data. As well, within the work, principles used while research of accumulating detailed metadata registration as the means of providing the base of evaluating the quality of received data, are submitted.

From the point of view of practical metadata using connected with the indicators, the experience of SBS using MDR for creating production environment with high standardization level, is very important [6]. In SBS, the based on GSIM data model is used, that is oriented for description of input and output information flows for PC, recognizing different levels of detailed information of the variables description as the identifiers of statistic indicators and input information for their settlement.

NSO of Slovenia within the frames of creating the metadata base has elaborated the infrastructure scheme of statistic metadata available for outside user as reference information to understand statistic data and other aspects of statistic production. In [7], principles of using accepted standards, methodology of creating and controlling reference metadata implemented in the prototype of programmed using to coordinate metadata base are researched, also complex view for the process of creating and using reference data is submitted – from producing questionnaires and receiving under them survey results to dissemination the processed results as statistic publications.

Defining of not solved before parts of general problem. Adapting the solutions of GSIM Specification [2] to the problematic issues of the schemes of MIE of CEI producing is not fully lightened in the domestic scientific sources.

Target setting. Aim of the research is considering this problem in part of the main aspects of MIE of CEI using to provide data quality control in IS controlled by metadata, also provision for the users MDR information with the purpose of analytical research and evaluation of received data.

Statement of the main material. MIE of CEI providing the access to necessary meta-information has to fulfill in IS double function: providing automation of production process and support of quality control conducting of the produced data by interested users. The latter is an objective of the article. In practical sphere this function of MIE of CEI can be specified as the following: providing data control quality the result of which can be considered definition of data as relevant ones, accurate and safe, timely and punctual, unambiguous and comparative, accessible and clear. Supporting on the provision stated in [8], let's study these characteristics through the prism of possibility their further definition with the help of metadata concerning economic indicators as qualitative-quantitative description of the analysis object.

1. *Relevance* is a qualitative estimation of suitability for use by the users received indicators at the current moment for potential use in future. Data can be considered relevant if they are actual and refer to one set of objects. To analyze data relevance, the user should have the access to information that could give the opportunity to define data correspondence to the needs of use. For this information, in first turn, indicators definition and methodology description of their creation, is related.

2. *Accuracy* – is the level under which data correctly evaluate or describe figures and characteristics that should be measured. By consolidating in IS information out of different sources, there can arise the problem of accuracy evaluating. Mechanisms of problem solving are opportunities to fix expert estimation, methodology of accuracy evaluation, formalizing the process of accuracy estimation, definition of rules and means of cross data analysis by information consolidation out of different sources to avoid considerable discrepancies in indicators with the same names, related to one object of observation or analysis on the definite time period. Moreover, there in the IS should exist descriptive part with information under which the user has opportunity to conduct estimation on his own, and for automatized processes of

estimation – formalized part. *Reliability* envisages that primary data, intermediate results and output data are regularly estimated and checked as for accuracy; sampling errors and other deviations are estimated, fixed and documented, corrections are analyzed for further improvement of production process.

3. *Timeliness* of data manifests time period starting from the event of phenomenon that are described by it and within the period of which this information is left to be actual and requires time complexity of all selected data sources. *Punctuality* of data envisages existence of general acceptable list of the produced products and represents the level of timeliness of data issue. Periodicity of the goods production should correspond to the requirement of users, information about that should be provided in beforehand mentioning possible deviations from the estimated term of their providing. To provide timeliness and punctuality, there in the IS should exist the graphics of works execution on collecting, proceeding, analysis and dissemination data/information.

4. *Coherence* and *comparability* represent connection of data as a level of their logic combination, sequence, mutual coordination and its storing. Correspondence to these characteristics means: 1) absence of conflicts among data and availability of obligatory connections between them; 2) data collecting under single standards concerning the definitions, covering the units, rules of classification; 3) data comparing that are submitted from various sources and with different periodicity, and their coordination in correspondence in the process of treatment; 4) providing coordination and uniqueness of definitions concerning the researched objects, indicators, used terms and descriptive information relating possible data limiting. Comparability can also envisage data continuity as presented in their history for the required period of time, and constituency means absence of data duplication and their unique identification, as well impossibility to use without explanations the same term for various definitions or data elements (for instance, indexes, inquiries and feedbacks for them) and different conditions for one and the same term or element of data, to input without explaining changes that shall influence on the indicators meaning. The role of metadata by explaining possible changes that can arise within time in concepts and methodologies, is defining.

5. *Accessibility and clarity* represent simplicity with what the user can understand appropriately use and analyze submitted to him in economic data type. Accessibility envisages following data by metadata and explanations to make easier correct interpretation and using the received information, and clarity–availability of syntaxes rules of creating metadata description, definition of nick names, supporting various versions of meta descriptions in correspondence with changes of the defined indicators. Providing the accessibility and clarity demands metadata standardization, their descriptions unification, glossary availability appointed for the users with explanations and comfortable navigation tools and search in the accessible for the user segment of MDR.

Definition of quality characteristics is a defined way pointer concerning the content of IO MIE of CEI that support indicators descriptions for these characteristics receiving. Creating MIE of CEI requires preliminary definition of such aspects important for systematization of understanding about available information resources, finding out the need in their unification and standardization, for adding and extending existent conceptual framework (list of the works in brackets correspond to the number of data quality characteristics, that corresponded by the results of definite actions fulfilling):

– unambiguous indicators name and creating their conceptual description in correspondence to details necessary for different groups of the users. It is obligatory to define for each indicator the base that represents its essence as a complex of characteristics and peculiarities of the phenomenon, process, object not mentioning time conditions and location, as well quantitative meaning of characteristics; (1, 4, 5)

– indicators connection with the same name, definitions of which are received out of different sources and/or are created by different algorithms, explanations concerning possible fluctuations in meanings, possibility to compare data by indicators with the same names in various forms of submitting/transfer/presenting (hereinafter submitting) of the information by the results of performing various types of activity (statistic observations, compilation data out of various sources, preparing publications, submitting information to the Internet and others) and for different periods of research. The latter envisages storing “the history” of indicators concerning the changes in methodology of its creating or in its characteristics (as it is recommended in [5]), as well storing indicator description by terminating its action, if correspondent to it data are available; (1, 4, 5)

– indicators content, their concurrent meta-information considering provision of information requirements of all users, including evaluation of the level of the meanings correspondence to the needs and details of the inquired information; (1, 3, 5)

– content and structure of time series with relevant explanations concerning creating these rows and providing continuity of time series (for example, data as for the algorithms of recalculation); (1, 4, 5)

– metadata hierarchy and categories as means of navigation providing in MIE of CEI as topic catalogue, that comprises the categories corresponding to the defined list that is included in MIE of CEI type IO and provides the opportunity of further detailing concerning definite samples of IO. The categories list should become starting point for the user to perform navigation and search of necessary information in the MIE of CEI as sampled by the decisions submitted in [3]; (5)

– content of methodology documents that submits full picture concerning creating, controlling and evaluating indicators quality. Primary and secondary indicators meaning of which are received from outside sources should have descriptions that available for the user together with the descriptions of the tools set of information collecting (for example, inquiries, questionnaires, reporting documents) and in forms of administrative data submitting, data of companies-partners and other secondary indicators (for example, data of the results of various statistic and marketing observations; information received from the Internet; analytical tables of scientific research institutions), derivative indexes meaning of which should be settled in IS by definite algorithms should be followed by the descriptions of these algorithms and references to the documents concerning methodologic settlement; (1, 2, 4, 5)

– content and infrastructure of classifiers, inquiries and other normative-reference information (hereinafter – SRI) that is used in production process and/or is necessary for MIE of CEI, including for creating the descriptions of data content as a set of classifying and/or other qualitative features under which data are grouped by collecting, processing, extending; (1, 4, 5)

– infrastructure of supporting MIE of CEI as a complex of software means, information providing and organizational structure of MIE of CEI servicing to provide the policy of resources controlling, access and confidentiality, providing for the user clear and comfortable interface (considering experience submitted in [7]). (5)

The first turn measure by elaborating the scheme of the MIE of CEI is creating the structure of meta-information indicator components, under which it is possible to perform implementing its description. Grounded on the definition of GSIM Specification and considering [2] the extension offered by SBS [6], we can define three levels of meta-information description concerning indicators and suggest the following their content:

– conceptual level, that corresponds to indicators description base with reference to the type of the object of economic analysis that represents indicator essence, provides unambiguous meaning of the base and includes such attributes of the index:

- index code;
- name that in brief appearance provides detailed information concerning the index essence;

- conceptual definition as descriptive information referring indicator under which it will be possible to define criteria of the attributes determining for other levels of meta-information description;

- object type of economic analysis: population, household, enterprise, territory, etc.;
- character of settlement: absolute average with correspondent details (average arithmetic, harmonized, etc.), relative (including nominal one), other derivatives;

- type of the metering unit: natural, conditional-natural, cost, share, etc.;
- maximal extended cutting of data in input sources (connecting to the classifiers and references);

- representative level, that can be oriented for definite group of objects of one type, includes conceptual level and is added by the attributes:

- indicator code description on a representative level that comprises indicator code as a component;

- sphere type of indicator meaning: range of the meanings, nominal scale, ordinal scale, etc.;
- associated with the type of the meaning sphere definitions for discreet or continuous value;

- used measurement unit;

- comments/explanations concerning indicator description on the representative level;

- contextual level, that comprises representative level and is added by the attributes:

- indicator code description on the contextual level that comprises indicator code description on a representative level as a component;

- class of data submitting (data type, form and/or data mask);

- indicator typology that includes means of calculations (primary, secondary, derivative), character concerning researched phenomenon (interval, moment), synthesis level (generalized, partial/share, additional/not direct), definition in space (general territorial, local), means of creating (normative, plan/predicted, contractual, accounting, statistic, analytical, etc.);

- specifying definition that makes impossible double interpretation of the indicator essence concerning the measured phenomenon, process of characteristic of the objects under economic analysis and defines indicator measurement on the contextual level to make easier the procedure of decision making referring use of its meanings in definite situations;

- extended definition that includes detailed explanations important for using the tools of data collecting;

- determinations of the source of data receiving for indicators settlement/creating as a list of references for indicator descriptions on the contextual level that are used by settlement of the descriptive indicator;

- description of reference to the description of the algorithm of indicator calculation/creating;

- definition of the location of indicator meanings as a reference for definite positions in general list of data sources (hereinafter – location);

- multiplier of the measurement units in location (for example, by submitting data in thousands of measuring units);

- used in location view of data submitting;

- extended/detailed or shortened name that is used for indicator by location (for example, indicator name in publication).

On the contextual level, there can be defined as well determined other attributes that correlate indicator with the definite tool of data collecting and produced good/information.

Thus, semantic aspect defined by the conceptual level was separated from the description of the means of data submitting that, in its turn, was separated from description of the means of indicator submitting, that in its turn, was separated from the details connected with its use. This

approach allows to separate context of indicator from its submitting, that provides efficient base for implementing contextual search in connection with the researched issue/problem.

Information of the contextual level shall have considerably higher level of dynamics in comparison with the conceptual and representative ones, that's why all meanings of the attributes should have period of action within which they are actual. In IS, indicator description is feasible to submit as a set of attributes: code, name and definitions in available type, the rest of the attributes if possible should be submitted in coded type with the connection to correspondent IO. With this purpose, MIE of CEI should be included in IO that supports the indicators descriptions and provide receiving of the characteristics of indicators quality. On the scheme 1, such scheme of connection is presented as a reference of IO support of the indexes description to the relevant level of meta-information description referring indicator, where MIE of CEI includes the following blocks: CEI, description of data source, SRI, administrative information, algorithms description, IO of the navigation mechanisms support and search. The following notes should be made that are to be necessary taken into consideration as from the experience of their implementing in NSO, in particular, analogue systems.

1. CEI in reality can have more complicated structure as it is presented on scheme 1 (for example, it can include the catalog where indicators are distributed by definite categories).

2. On the contextual level, equal indicators define its location of its meaning in definite source, that are connected to the tools of data collecting, or description of the form of secondary indicators submitting or produced product/information (to which there will be included as well intermediary results), that are defined on scheme No. 1 with the relevant referring to the list of these sources that is combined with their description. By detailed considering, these descriptions shall have complicated structure combined between each other by IO of the lower level of detailing, under which it is necessary to make the following notes:

- descriptions of the sources should be based on CEI that means connection of the determined in the source indicators to definite sample of the contextual level;
- descriptions of the goods/information should have on that level connection with the algorithms of their creation, and descriptions of the forms of providing can have secondary indicators and tools of data collecting. For all sources, there should be established connections with the their control description, and for the results received from BD – relevant explanations;
- each source should be connected with IO, that provide data concerning its description (source structure, data forms), responsible performers (persons/departments responsible for the source and its meta-information components), conditions of data receiving, evaluation of these data quality;
- a set of tools for data collecting may have the type of questionnaire that shall complicate the structure of MIE of CEI, since indicator is created by definite algorithm by processing the answers for the questions, and that will require the definition of the question sources for the answers with the connection of the answer to the index and description of the algorithm of its creating from this answer;
- evaluation of the results quality are connected to the definite data source, but since they are made on definite PC, then there are errors of collecting and other deviations are fixed and documented, the estimations, corrections and results of the analysis of these actions are to be connected to the relevant PC.

Since scheme on Figure has general character, the latter two aspects are not submitted on it.

1. Block of SRI for MIE of CEI includes references of the attributes meanings as the components of CEI and descriptions of the overview of the meanings submitting of indicators. In the descriptions, there is a catalog creating envisaged for the SRI objects as a list of classifiers and references of use ones in IS to update data of the SRI objects with provided definitions and structure, as well as the catalogue to overview the submitted meanings. Overview catalog can be created as group of the lists of the SRI objects out of relevant catalog considering opportunities to give the detailed level for the classifiers coding and classifiers and references of hierarchic structure. The amount of submitted indicators meaning for the definite source will be fixed as well for the indicator contextual level and can be limited in comparison with the conceptual level by means of data aggravating in the process of processing. Changes in overview of data submitting should be fixed, that means that this component should have the period of validity. CEI should have the connection with the Classifier of the system of the units meanings with the purpose of measuring and accounting (CSUMA) that is used for coding the units of measurement of indicators meanings. To demonstrate its connection with presenting the level, there is on Figure its separate description.

2. Administrative information on the scheme of Figure is presented by the chart of performing by the PC and connected with it list of responsible performers that should provide contacts with the performer. That envisages structure definition of this list considering information capacity for inside and outside users and relevant actions on distributing the access of the users' groups to MDR. PC Chart performing should be connected with the list of sources for defining input information of PC by the results of fulfilling. Implementing of the same scheme of IO with PC connecting is considered in [4] in context of supporting the results of PC performing by additional information for the user. Opportunity to track the actions on the indexes data processing under the chart of PC performing provides the availability of different descriptions of the contextual level on various stages of processing connected with the single description of the contextual level of indicators level.

3. Descriptions of the algorithms of the sources controlling: the outside one by the components (indicators, questions, answers, etc.) pass-through concerning the sources in general, cross with the other sources; and algorithms of creating/settlement of indicators should be presented as formal and/or wording descriptions with references for correspondent methodological document, also to they should have period of validity, that shall allow to input new and specify the existent algorithms together with storing the previous descriptions.

4. Categories, glossary, thesaurus and IO of their supporting belong to IO supporting, in particular mechanisms of navigation and search. On the scheme of Figure it can be seen that connection of the categories only with CEI is established, since establishing the connections with other IO groups that should be presented by correspondent parts (SRI, tools for data collecting, data sources and other IO, that arise by practical implementing of MIE of CEI) shall considerably complicate the scheme of acceptance. The tool to assist the user in specifying the terms, evaluating data relevance, forming the inquiry and analysis the results of search is presented by glossary that includes definitions and explanations concerning the categories, indicators, classifiers, directories, catalogs and other information concerning the context of metadata and other data. Glossary should present itself collection of terminological definitions that do not allow double interpretation, cover the presented in informational base of IS objective sphere, and in separate issues have references to correspondent methodological documents and meta-informational indicators descriptions. It is feasible to be created as hierarchic structure where the terms can be detailed in the process of search of necessary indicators by their sense, introducing to the definite source of data with the purpose of providing clear and accurate evaluation of the correspondence of searched indicators to the expected one from the user. To implement this opportunity, connection of the glossary with CEI is established. Tools

and products can also require definition in the glossary and combination with relevant descriptions, methodological documents and recommendations, including with quality estimation. Thus, by practical estimation, the glossary shall have more complicated structure and more connections with MIE of CEI, than it is presented on the scheme of Figure.

To avoid data redundancy, providing the opportunities to recognize existing connections between indicators, as well integrity of new definitions and terms, there should exist connection between the users with the IS through one of two of the interrelated references of the components – glossary and thesaurus. Thesaurus is used as system vocabulary of the terms names and classification of their interrelations and is meant for single unified formed information submitting and supporting the user's interface, providing by that opportunity to search by means of complete or partial terms input, that are indirectly connected with the glossary definitions. Thesaurus has the following components: list of words-definitions to ease the search operations of necessary term, list of the words to organize compact storing of the word-definitions list, list of the terms for their connection with the given in the glossary definitions and performing sampling and search of definitions by definite set of the terms.

5. There are no descriptions of IO on the scheme of Figure connected with documenting and supporting time rows, since these aspects require separate deepened consideration in the context of practical implementing.

Conclusions and propositions. Proposed within the article structure of MIE of CEI shall provide creating of comprehensive information concerning indicators and shall submit: informational base for sequential harmonization of the methods and concepts for all types of work on preparing and performing economic analysis; support for the users by analyzing sources quality, sources of their receiving and analytical products according to the descriptions and specifies quality demands, as well, by evaluating the efficiency of methods of data collecting and processing; infrastructure for supporting the researches on the issues of conceptual search, specifying the level of indicators relevance concerning the researched issue, data harmonization by using various informational sources. Besides, this structure shall allow to continuously create MIE of CEI, track the whole process of definitions creating from the very beginning (receiving input data) until the end (results creation for extension), shall provide multiple use of metadata. Analysis of the index structure is an important one for its identification and classification by organizing storing, search. Integral processing of data in IS, here-with, each structural element of indicator can be considered as a peculiarity of classification of the definite indicator amount. Perspective of further development in this direction lays in deepening the details of the suggested MIE of CEI to cover all necessary for practical use indicators aspects.

References

1. Generic Statistical Information Model (GSIM): Communication paper for a general statistical audience. Prepared by the High-Level Group for the Modernization of Statistical Production and Services (ECE/CES/2014/2): United Nations Economic Commission for Europe Conference of European Statisticians Sixty-second plenary session (Paris, 9–11 April 2014). *www.unece.org*. Retrieved from http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/2014/ECE_CES_2014_2-Generic_Statistical_Information_Model.pdf [in English].
2. Generic Statistical Information Model (GSIM): Specification (Version 1.1, December 2013). *www.unece.org*. Retrieved from http://www1.unece.org/stat/platform/download/attachments/97356610/GSIM%20Specification%201__1.pdf?version=3&modificationDate=1388474373573&api=v2 [in English].
3. Daniel W. Gillman. Terminologies and Standards. / United Nations Economic Commission for Europe Conference of European Statisticians Workshop of the Modernisation Committee on Standards: International Collaboration for Standards-Based Modernisation (Geneva, Switzerland, 5 – 7 May, 2015). *www.unece.org*. Retrieved from <http://www1.unece.org/stat/platform/download/attachments/>

ТЕОРЕТИЧНІ ПРОБЛЕМИ РОЗВИТКУ НАЦІОНАЛЬНОЇ ЕКОНОМІКИ

112133421/Topic%20IV%20-%20United%20States%20of%20America%20-%20Paper.pdf?version=1&modificationDate=1430138677010&api=v2 [in English].

4. Mauro Scanu, Cecilia Casagrande. GSIM and the Sistema Unitario dei Metadati: State of application of the standard / United Nations Economic Commission for Europe Conference of European Statisticians Workshop on Implementing Standards for Statistical Modernisation (Geneva, Switzerland, 21 - 23 September 2016). *www.unece.org*. Retrieved from [http://www1.unece.org/stat/platform/download/attachments/120980906/Italy%20-%20The%20Generic%20Statistical%20Information%20Model%20\(GSIM\)%20and%20the%20Sistema%20Unitario%20dei%20Metadati%20state%20of%20application%20of%20the%20standard.pdf?version=1&modificationDate=1469612609059&api=v2](http://www1.unece.org/stat/platform/download/attachments/120980906/Italy%20-%20The%20Generic%20Statistical%20Information%20Model%20(GSIM)%20and%20the%20Sistema%20Unitario%20dei%20Metadati%20state%20of%20application%20of%20the%20standard.pdf?version=1&modificationDate=1469612609059&api=v2) [in English].

5. Magnus Eriksson The Register Utilisation Tool: A Practical implementation of GSIM as support in register-based research / United Nations Economic Commission for Europe Conference of European Statisticians Workshop on Implementing Standards for Statistical Modernisation (Geneva, Switzerland, 21 - 23 September 2016). *www.unece.org*. Retrieved from <http://www1.unece.org/stat/platform/display/ImpMod2016/Home> [in English].

6. Stefan Berg, Klas Blomqvist, Eva Holm, Lars-Göran Lundell, Henrik Lundström, Thomas Nyberg and Jens Olofsson. Case Study: Use of GSIM – Statistics Sweden's model for a Central Metadata Repository. / United Nations Economic Commission for Europe Conference of European Statisticians Workshop of the Modernisation Committee on Standards: International Collaboration for Standards-Based Modernisation (Geneva, Switzerland, 5 – 7 May, 2015). *www.unece.org*. Retrieved from <http://www1.unece.org/stat/platform/download/attachments/112133421/Topic%20II%20-%20Sweden%20-%20Paper.pdf?version=1&modificationDate=1430138197744&api=v2> [in English].

7. Julija Kuti, Tina Šijanec. Harmonizing reference metadata in SURS. Working paper 2. / United Nations Economic Commission for Europe Conference of European Statisticians Workshop of the Modernisation Committee on Standards: International Collaboration for Standards-Based Modernisation (Geneva, Switzerland, 5 – 7 May, 2015). *www.unece.org*. Retrieved from <http://www1.unece.org/stat/platform/download/attachments/112133421/Topic%20II%20-%20Slovenia%20-%20Paper.pdf?version=1&modificationDate=1430138170382&api=v2> [in English].

8. ESS Handbook for Quality Reports. 2014 Edition. Eurostat. *www.ec.europa.eu*. Retrieved from <http://ec.europa.eu/eurostat/documents/3859598/6651706/KS-GQ-15-003-EN-N.pdf> [in English].

Список використаних джерел

1. *Generic Statistical Information Model (GSIM): Communication paper for a general statistical audience*. Prepared by the High-Level Group for the Modernization of Statistical Production and Services (ECE/CES/2014/2): United Nations Economic Commission for Europe Conference of European Statisticians Sixty-second plenary session (Paris, 9–11 April 2014). – 37 p. – [Electronic resource]. – Access mode : http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/2014/ECE_CES_2014_2-Generic_Statistical_Information_Model.pdf.

2. *Generic Statistical Information Model (GSIM): Specification (Version 1.1, December 2013)* – 236 p. [Electronic resource]. – Access mode : http://www1.unece.org/stat/platform/download/attachments/97356610/GSIM%20Specification%201__1.pdf?version=3&modificationDate=1388474373573&api=v2.

3. *Daniel W. Gillman. Terminologies and Standards* [Electronic resource] / United Nations Economic Commission for Europe Conference of European Statisticians Workshop of the Modernisation Committee on Standards: International Collaboration for Standards-Based Modernisation (Geneva, Switzerland, 5 – 7 May, 2015). – 9 p. – Access mode : <http://www1.unece.org/stat/platform/download/attachments/112133421/Topic%20IV%20-%20United%20States%20of%20America%20-%20Paper.pdf?version=1&modificationDate=1430138677010&api=v2>.

4. *Mauro Scanu, Cecilia Casagrande. GSIM and the Sistema Unitario dei Metadati: State of application of the standard* / United Nations Economic Commission for Europe Conference of European Statisticians Workshop on Implementing Standards for Statistical Modernisation (Geneva, Switzerland, 21–23 September 2016). – 12 p. – [Electronic resource]. – Access mode: [http://www1.unece.org/stat/platform/download/attachments/120980906/Italy%20-%20The%20Generic%20Statistical%20Information%20Model%20\(GSIM\)%20and%20the%20Sistema%20Unitario%20dei%2](http://www1.unece.org/stat/platform/download/attachments/120980906/Italy%20-%20The%20Generic%20Statistical%20Information%20Model%20(GSIM)%20and%20the%20Sistema%20Unitario%20dei%2)

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0Metadata%20state%20of%20application%20of%20the%20standard.pdf?version=1&modificationDate=1469612609059&api=v2.

5. *Magnus Eriksson*. The Register Utilisation Tool: A Practical implementation of GSIM as support in register-based research / United Nations Economic Commission for Europe Conference of European Statisticians Workshop on Implementing Standards for Statistical Modernisation (Geneva, Switzerland, 21 - 23 September 2016). – 11 p. – [Electronic resource]. – Access mode: <http://www1.unece.org/stat/platform/display/ImpMod2016/Home>.

6. *Stefan Berg, Klas Blomqvist, Eva Holm, Lars-Göran Lundell, Henrik Lundström, Thomas Nyberg and Jens Olofsson*. Case Study: Use of GSIM – Statistics Sweden’s model for a Central Metadata Repository. / United Nations Economic Commission for Europe Conference of European Statisticians Workshop of the Modernisation Committee on Standards: International Collaboration for Standards-Based Modernisation (Geneva, Switzerland, 5 – 7 May, 2015). – 18 p. – [Electronic resource]. – Access mode: <http://www1.unece.org/stat/platform/download/attachments/112133421/Topic%20II%20-%20Sweden%20-%20Paper.pdf?version=1&modificationDate=1430138197744&api=v2>.

7. *Julija Kuti, Tina Šijanec*. Harmonizing reference metadata in SURS. Working paper 2. / United Nations Economic Commission for Europe Conference of European Statisticians Workshop of the Modernisation Committee on Standards: International Collaboration for Standards-Based Modernisation (Geneva, Switzerland, 5 – 7 May, 2015). – 14 p. – [Electronic resource]. – Access mode: <http://www1.unece.org/stat/platform/download/attachments/112133421/Topic%20II%20-%20Slovenia%20-%20Paper.pdf?version=1&modificationDate=1430138170382&api=v2>.

8. *ESS Handbook for Quality Reports*. 2014 Edition. / Eurostat – 166 p. – [Electronic resource]. – Access mode: <http://ec.europa.eu/eurostat/documents/3859598/6651706/KS-GQ-15-003-EN-N.pdf>.

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