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IMPROVING CLASSIFICATIONS OF ECONOMIC SCIENCES IN A THESAURUS

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The goal is to study thesaurus as an instrument to define the classification of economic sciences, to adapt their classification to the increased information flow, to increase accuracy of allocation of information resources with consideration of the users' needs, to suggest making alterations in the classification of economic sciences made by the Institute of Scientific Information for Social Sciences of the Russian Academy of Sciences (INION RAN) in 2001.

The authors see the classification of economic sciences as a product of social communications theory – a differentiated aspect of social research. Modern science is subdivided into various aspects with varied subjects and methods. The latter overlap and form a hierarchy of concepts in science within the same research subject. The authors stress the importance of information retrieval systems for developing scientific knowledge. Information retrieval systems can immediately deliver data from different areas of science to the user who can then integrate the information and obtain a vivid picture of the research subject. Search engines and rubricators are becoming increasingly important as there is a tendency to isolated thinking with many Internet users.

The authors have devised a certain approach to using the thesaurus as the means of sciences classification and as a hyper language of science. The suggested methodological approach to structuring terms and notions via thesaurus have been tested at Syktyvkar State University and Syktyvkar branch of Saint-Petersburg Economic University.

Methods: deduction, induction, analysis, synthesis, abstraction technique, classification.

Results: there have been defined stages and main sections of the information-retrieval thesaurus of the hyperlanguage of economic science on the basis of existing classification systems of scientific knowledge.

Scope of application of results: library services, information technology, education.

Key words: economics, classification, rubricator, metalanguage, dictionary, encyclopedia, thesaurus, hysaurus, the Russian language, glottology, linguistics, philology.

СОВЕРШЕНСТВОВАНИЕ КЛАССИФИКАЦИИ ЭКОНОМИЧЕСКИХ НАУК В ТЕЗАУРУСЕ

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Цель статьи рассмотреть тезаурус как инструмент совершенствования классификации экономических науки, адаптации классификации экономических наук к возросшему потоку информации, повышения точности размещения информационных ресурсов к потребностям их пользователей, предложить изменения в классификации экономических наук, составленной ИНИОН РАН в 2001 году.

Задачи совершенствования классификации экономических наук и экономических дисциплин авторами рассматриваются в свете теории социальных коммуникаций - обособившегося нового направления социальных исследований. Современная наука разделена на отдельные подразделения с дифференцированными предметами и методами. Последние накладываются друг на друга, образуя иерархию понятий по предметам наук вокруг одного и того же объекта исследования. Авторами подчеркивается важность поисковых систем для раз-

вития научного знания. Они собирают к одному пользователю в одном месте и в один момент времени информационные массивы из разных наук, что позволяет обобщать информацию и получать более адекватную картину об объекте исследования с учетом знаний, накопленных в разных науках. Значимость поисковых систем и рубрикаторов возрастает в связи с негативной тенденцией формирования фрагментарного мышления пользователей Интернет-ресурсами.

Авторами был обозначен конкретный подход к использованию тезауруса как средства классификации наук и гиперязыка науки. Предложенный авторами методологический подход к структурированию терминов и понятий через тезаурус апробированы в деятельности Сыктывкарского государственного университета, Сыктывкарского филиала Санкт-Петербургского экономического университета.

Методы исследования: дедукция, индукция, анализ, синтез, метод абстрагирования, классификация.

Результаты: определены этапы и основные разделы информационно-поискового тезауруса гиперязыка науки в части экономики на основе существующих систем классификации научного знания.

Область применения результатов: библиотечное дело, информационные технологии, образование.

Ключевые слова: экономика, классификация, рубрикатор, метаязык, словарь, энциклопедия, тезаурус, гизаурус, русский язык, глоттология, лингвистика, языковедение, языкознание.

1. Basic Concepts and Categories of Economic Sciences Classification in the View of Social Communication Theory

The task of defining the classification of economic sciences and economic subjects is acute, because this aspect of economic science development has to be considered in the view of social communications theory – a new differentiated aspect

of social research. Modern science is subdivided into a variety of aspects, subjects and methods. The latter overlap and form a hierarchy of scientific concepts concerned with the same subject of research. For example, corporate governance is studied by sociology, economics and psychology. The idea behind governance in each of the fields is different (for example in sociology it is exchange, in economics it is redistribution and in psychology – leadership instinct), however, they do not smother each other, but define and create a vivid picture of the subject of research by means of different sciences. Here we need to put emphasis on information retrieval systems, which can deliver data from every branch of science to the user, which allows integration of information and which provides a vivid picture of the research subject by interlinking the knowledge from various branches of science. Search engines and search prioritizers are becoming increasingly important as there is a tendency to isolated thinking with many Internet users.

For example, electronic scientific libraries and information databases have become increasingly important when choosing articles. They are Web of Science, Scopus, Google Scholar, the Russian electronic scientific library, etc. Users of electronic scientific databases and libraries do not need to know titles or subject fields of magazines. A user needs only to enter key words to get the information about all the articles on the subject no matter whether they were published in a specialized or in a multidisciplinary magazine. A magazine just needs to upload its publications as PDF-files to one of international Internet electronic libraries or databases.

We are witnessing an exponential increase of information flow, but its fragmentation is increasing, too. However, there is a reverse process, which is defining of information systematization with the help of classifiers and thesauri.

A classifier is a systematized list of named objects, each of them having a unique code. The objects are classified by distribution rules into groups and subgroups, so-called classification groupings according to their properties of distinction or similarity. It is used in automated control systems and information processing. The

classifier provides a standard code language for documents, financial reports and automated systems.

The creation in 1876 of 'decimal classification' by Dewey, an outstanding American librarian and educator, was the most outstanding achievement in systematization. M. Dewey was especially proud of applying decimal indices. The system used simple and well-known symbols and Arabic figures in the form of decimal fractions to create a classification of all human knowledge in printed materials. However, after more than a century we can see another important aspect of M. Dewey's classification. He gave theoretical grounding and implemented a standardization of typical divisions (linguistic, ethnic, geographical and historical).

Another important achievement of his was introduction of an alphabetical subject index into the classification system, which allowed searching for books in any subject field regardless the place in the system the book occupied. Though the idea of such an auxiliary index was not new as they had already been used in the 13th century encyclopedias, books of the Renaissance epoch, by Konrad Gesner and in Schleiermacher's tables, they became an integral part of classification tables and library systematic catalogues thanks to Dewey. However, traditional catalogue technique does not disclose the document's contents with the help of subject headings to the necessary extent. Subject headings can only give general information about the subject of the document, so diverse and synoptical documents can be reflected in the catalogue only under a limited number of subject headings. Limited space and the time-consuming creation of card-catalogues made bibliographers elaborate complex rules of using subject headings. These rules together with dictionaries of advised subject headings constitute the indexing languages of subject headings. It is necessary to eliminate linear classification and expand the number of links between its terms.

Information classifiers perform two functions. Firstly, they make finding the necessary information easier as they reduce the amount of mechanical viewing with the help of generalizations and logical links. Secondly, classifiers act as links between producer and consumer of the information. Thirdly, classifiers are a

cognitive method, a certain generalized model of some aspect of subjective and objective reality.

Information fragmentation and the volume of information is constantly increasing. This brings about the problem of information resource allocation and its coordination to help researchers find the necessary information while identifying the results of their research using coordinates of information resources.

Information classifiers become a hyper language. They act as communication means, the way to express ideas and aggregate knowledge. The fact that hyper language constitutes a complex of similar units and their combinations ensures its integrity and specificity. A qualitative change occurring in one unit of the hyper language causes qualitative change in another unit and thus a change in the hyper language as a whole. It is significant that the closeness of ties between various items of a hyper language and their combinations can have various elements linked in different degrees, so we can apply the concept of hard (dense), semi-hard (semi-soft) or soft (loose) system. In an example of a soft system; when you are looking for information about John G. Lake and enter 'lake', the search engine would show results for 'lake' as a water body.

Hard (very close), semi-hard (semi-soft) or soft (loose) connection between lexical units is an important characteristic of a hyper language.

There exist various informational retrieval systems as grids. The best known are the following normative classifications, catalogues and prioritisers: Alphabetical Subject Index, Computer-Assisted System of Information Languages, Library-Bibliographical Classification, State Automated System of Scientific and Technical Information, General Systematic Catalogue, Uniform Classification of Literature, ISBN (International Standard Book Number), Russian National Classifier of Political Subdivisions, Russian Classification of Currencies, Russian National Classifier of Types of Cargos, Packaging and Packaging Materials, Russian Classification of Economic Activities, Russian National Classifier of Hydro Power Resources, All-Russian Classifier of Types of Economic Activity, Products and Services, All-Russia

Classifier of Measurement Units, All-Russia Activities Classifier, All-Russia Classifier of Information about the Population, All-Russia Welfare Classifier, All-Russia Classifier of Basic Vocational Education, National Classifier of Government Entities and Administration, All-Russia Classifier of Information about All-Russia Classifiers, All-Russia Classifier of Organizational Legal Forms, All-Russia Classifier of Capital Goods, All-Russian Classification of Products, Russian National Classification of Occupations of Employees, Positions of Civil Servants and Wage Category, Russian National Classifier of Mineral Resources and Subsoil Water, All-Russia Classifier of Enterprises and Organizations, All-Russia Classifier of Standards, All-Russia Classifier of Specialities of Highest Scientific Qualification, All-Russian Classifier of Countries of the World, All-Russian Classifier of Major Disciplines, All-Russia Classifier 'Standards and Technical Specifications', Russian National Classification of Managerial Documentation, All-Russian Classifier of Services Rendered to the Public, All-Russia Classifier of Forms of Ownership, All-Russian Classifier of Economic Regions, Standards System on Information, Library and Publishing Activity, Systematic Card-Catalogue of Articles, Universal Decimal Classification, etc. Classifications of the Institute of Scientific Information for Social Sciences of the Russian Academy of Sciences (<http://www.inion.ru/>).

Frame of reference is used in the Information Retrieval System, where every unit gets its coordinates, location like a star has its coordinates that show its location on the stellar map.

There are two methods of classifying economic information: symbolic, and accumulative and distributional. Symbolic method groups scientific data in terms of signs, dates, names, key words, symbols and location. There are no logical links between notions 'general - particular' in this case. Accumulative and distributional method involves information accumulation and its grouping into subject areas according to the following principle: if new knowledge cannot be referred to any of existing categories a new group or category is created. However, it is difficult to define new phenomena and categories.

The main drawback of symbolic, and accumulative and distributional classifications is that they lack time and location parameters of logical categories. Cells exist without any connection to time or location. Everything is happening simultaneously there, in one and the same place.

In modern linguistics a thesaurus is a special kind of general dictionary or a glossary, which provides information on semantic relations (synonyms, antonyms, paronyms, hyponyms, hyperonyms) between lexical units. Electronic thesauri is an effective instrument for describing certain subject areas and creating information retrieval systems. A thesaurus has to perform the following tasks: a) academic; b) act as an intermediary dictionary for machine translation; c) information search tool; d) an instrument for creating semantic, systematic, conceptual dictionaries and glossaries. However, information in the form of a thesaurus is increasingly used for describing actions, objects and processes through singling out principal and subordinate categories – ‘from general to particular’.

Designing, elaboration and creation of lexical and semantic basis of thesaurus (information retrieval) undergoes the following stages: 1. Creation of general glossary – choosing lexical units, which are acute for information users. 2. Normalization of lexis. 3. Systematization and clustering of lexical units. 4. Creating classification schemes of notions. 5. The form in which lexical units are stored in the thesaurus (information retrieval). (N.I. Gendina, 1991, p. 24).

Creation of a General glossary is the most important stage of creation of a thesaurus (information retrieval) as lexical units are the elementary particles – ‘atoms’, ‘bricks’ and ‘construction material’, which are used for creating metalanguage of linguistics. That is why search characteristics and, which is more important, technical ability of a thesaurus (information retrieval) to identify the meaning and its semantic characteristics depend on how well this stage is performed. The stage is preceded by studying typology of linguistics. Not all words can be used in the General glossary, but only key words, i.e. the words which convey the message.

A key word is a word or a word combination, which conveys the most significant information for a particular text (or query) in terms of information retrieval.

Key words are mostly terms, which possess a nominative characteristic (the ability to name an object), monosemy, accuracy and have no expressive meaning.

In our subject area we can single out at least three groups of terms:

1. Special terms used only in linguistics, which are its identification signs or symbols. For example, the terms like ‘grammar’, ‘alphabet’, ‘phonology’, ‘word-building’, ‘morphology’ strongly suggest the idea of linguistic field.

2. Terms from related branches of science, ‘introduced’ terms that denote the notions from other fields, which are necessary for this particular subject area. They reflect the most important feature of modern science – integration and convergence of scientific ideas.

3. General scientific terms that exist in any branch, for example: method, analysis, research, object, reference book, review, manuscript, theory, law, etc., constitute a so-called general lexis.

When a thesaurus (information retrieval) is being created every time it is necessary to decide which group a certain word has to be referred to, whether it needs to be included into General glossary of the thesaurus as omitting lexical units inevitably leads to information loss during the search, but too much vocabulary makes the thesaurus too bulky and impractical.

Terms from the first group form the lexis of the thesaurus (information retrieval) of linguistics metalanguage. They are key terms. The fact that there are no formal criteria of importance or non-importance of the terms of the second and the third groups for the thesaurus (retrieval system) makes the choice much more difficult.

After connecting the idea of a ‘lexical unit’ with ‘key words’ and ‘terms’ it is necessary to single out a category of non-key words, i.e. words that can be easily

neglected at this stage of creating lexico-semantic basis of the thesaurus (information-retrieval). They are functional words (particles, prepositions, conjunctions, interjections) and commonly used general scientific words like ‘theory’ (without mentioning what kind of theory), ‘law’, ‘problem’, ‘acute’, ‘meaning’, etc., i.e. terms that cannot be referred to the concept of a bulk language of economic studies.

Besides the sources of lexical units mentioned in ‘Thesaurus Sources of Metalanguage of Linguistics’ of Chapter 1 there are a few more: 1) already existing thesauri (information retrieval), which have a limited vocabulary: Universal Decimal Code, Library-Bibliographical Classification, lists of subject rubrics, classifiers, thesauri, etc. 2) dictionaries of scientific terminology, reference books, state standards, definition dictionaries, encyclopedic and other normative-reference books; 3) document collection on the theme of the thesaurus (information retrieval) in modeling with recent 10 years’ lexis (the supposed period of terminology renovation) in the amount of several thousand of sources (articles, monographs, text-books, etc.) This volume allows acquisition of representative corpus of lexis, which characterizes research subjects; 4) the array of queries from potential consumers of information, which, as a rule, contains the most recent terms (this array will be supposedly formed in interactive mode when the first versions of thesaurus (information retrieval) are available in the Internet.

When the thesaurus (information retrieval) is being created all these sources of lexis are used simultaneously.

The lexical units chosen as the result of analysis are included into General glossary – as a basic terminological block. The main characteristic of General glossary is lexical coverage.

Normalization of the lexis is another important aspect of creating a thesaurus in economics. As lexical units (key words, terms) are chosen and uploaded to the relational database of lexicographical data there arises the task of their uniform recording and normalization. More specifically, the normalization problem is solved simultaneously during choosing lexical units, however, for convenience

normalization of lexis can be a separate stage of creating lexico-semantic basis of the thesaurus.

Normalization of lexis is performed by two operations: 1) key words are uploaded in uniform grammar form (morphological level of normalization); 2) synonymy and polysemy are identified (semantic level); 3) formatting is made uniform (e.g.: to make lexicographic data uniform upper case (capital letters) is used in all the entries, and spaces are replaced by «_» (underscore) to make program processing of a word combination similar to that of separate words.

Uniformity of the grammatical form of key words is achieved with the help of the following procedures: achieving uniformity of lexical units (gender, number, case). As a rule, countable nouns are entered in the plural form of the Nominative case, uncountable - in singular form of the Nominative case. Adjectives and participles are entered in the Nominative case, plural. These rules may vary and depend mostly on sources.

For example, we need to enter the term 'Goods quality', but the source has words 'Consumer properties of goods'. The first notion is wider than the second. It is necessary to use the term from the primary source. Of course, focus on separate words (Uniterms) allows achieving considerable depth and makes indexing more detailed as then one can easily manipulate the elements of search images when performing the search. However, it is then necessary to develop a complex system of grammar to prevent information noise. Besides, mechanical splitting of multi-word terms that correspond to certain scientific and technical notions will inevitably lead to information loss during the search and will reduce accuracy of the search result.

In practice set expressions, which denote inseparable concepts are often used instead of a lexical unit – we would call them 'terminologisms' (like phraseologisms). It may seem strange how such word combinations appear as the word 'term' (late Lat. *terminus* – term derived from the Latin *terminus* – limit, boundary) – is a word or a word combination which is to strictly define a notion and its relations to other notions within the subject field. Terms serve as specialist,

restrictive naming units typical for the particular subject field to denote objects, phenomena, their properties and relations. They exist only within the area of specific terminology. Unlike words with general meaning terms are not connected with the context. Within a certain system of ideas a term has to be monosemantic, systematic and stylistically neutral. For example, competition/quality/costs.

However, nowadays there are no strict criteria that would allow to clearly differentiate between general and particular, and differentiate between set expressions and more flexible ones. The existing recommendations are of unformalized character. In most cases the decision to preserve a word combination as a separate lexical unit is taken on the basis of statistical data (observations on how often the word combination occurs in the text massifs in question) or on condition that the thesaurus (information retrieval) is not likely to use components of a word combination separately.

In our case we need to define the order in which separate words in a word combination have to be entered, because not only separate words, but word combinations - terminologisms, are used in the thesaurus (information retrieval) under creation. As for word combinations, which consist of an adjective and a noun there is a dilemma whether to use direct or inverted word order. For this case there are no universal formal criteria. In this case the authors of the thesaurus take a decision in every particular case. To make lexical units more condensed and uniform it is recommended to use an inverted form when the noun is placed first. However, it is impossible to always apply inversion, as very often this can lead to the loss of heuristic function of the first word of a lexical unit, or it destroys the standard term.

Specifying polysemy and homonymy at normalization stage can be achieved in the two following ways. The first, a simpler way, is when a polysemic word is explained by means of a word combination. In the second, lexicographical method, special markers, which specify or limit the meaning, are used. The following types of explanations, which are provided in parenthesis next to the polysemantic word are used: - explaining the lexical unit with the help of a synonym; - referring the lexical unit to a certain division or subdivision; referring the lexical unit to a certain

category; referring the lexical unit to a certain class of objects; - specifying certain objects of action.

Hypertext thesaurus – hysaurus - a database with cross hypertext reference, which gives definitions (interpretations, citations) of key notions – terms, which characterize the particular area and connections with allied subjects. On the other hand, one and the same term can be polysemic even within one scientific subject field. The sources of hysaurus are electronic dictionaries, reference books and encyclopedias. Constructing an economic hysaurus actually means creating a metalanguage of economics. It is a special secondary language as it contains hyperlinks to dictionaries and encyclopedias, which form the language of the first order and the basis of a metalanguage. Metalanguage is a special semiotic system, which is used to define concepts and connections between terms of the first-order language.

Thesaurus is created in the following stages: first, thematic area of a thesaurus is defined; then a massif of lexical units is collected; then the glossary is formed; dictionary entries and references are created; editing the thesaurus so that it would comply with standards; expert examination and registration of the thesaurus.

However, it is necessary to consider the following. 1) The choice of primary sources and clustering subject area. When sources are chosen the following should be considered: a) the most precise correspondence of the lexical material to the subject field; b) usability and importance of sources. 2) Creation of a general glossary. Descriptors, ascriptors, lexical units, separate words (nouns, adjectives, verbs, pronouns), noun phrases, lexically important components of compound words; acronyms of words and word combinations; relators. 3) Singling out semantic fields. Here it is necessary to define groups of relevantly equivalent terms. The latter unite lexical units which have the following relations between extensions: a) they are equal, b) they coincide, c) there is subordination, d) there is no connection. A dominant is singled out in a semantic row, i.e. the word, which can replace any word in the row. The dominant is called a descriptor. The synonym of a descriptor is called

ascriptor. 4) The main types of ties in economics are: class-type; whole-part; reason-consequence; raw material-product; administrative hierarchy; process - result; subject of research - area of research; exchange - hault of exchange; proportion-current; area of research – subject of research; functional similarity – process - subject; property - property owner; antonymy; criterion-indicators; content-form; quantity-quality. When constructing paradigmatic ties it is necessary to define the ways in which they are revealed: analytical, graphical, lexicographical, tables, hierarchy (transitivity and asymmetry), association, relation, general - particular. 5) Dictionary entries must be subdivided into thematic, categorical and mixed types, and directories – into permutational and hierarchic. In the list of special categories lexical units have to be subdivided into general categories, names of subjects and areas of activity, subjects, materials, methods, processes, operations, phenomena, properties, values, parameters, characteristics. Relations, structures, models, laws, rules, abstract notions. A dictionary entry can include: frequency of descriptor use, descriptor code number, descriptor code in classified index, classification numbers, auxiliary semantic and lexicographical labels, equivalents in a foreign language. 6) Frequency statistical analysis, number of alterations, sorting of glossaries can be used for automation of the process of thesaurus construction. Checking of reciprocity and referential integrity of links, creating directories, converting into the necessary formats and encoding.

Hypertext can be created on the basis of existing electronic texts. Hypertext is a method of organizing electronic and computer documents, which allows reflecting associative ties between various subdivisions, notions and terms. When reading such a document as an e-book one can follow all the associative links of a new or unclear notion that would uncover its idea or disclose its relation to other objects, categories and terms. The idea behind a hypertext is that it contains hyperlinks to other texts.

Internet is an example of a hypertext. In IT hypertext is used as the way to prepare and distribute texts, and users can choose their path when studying the material. To prepare a hypertext the information is ‘cut’ into small portions, easy to

operate. Then the user introduces hyperlinks into the text. When a user clicks the hyperlink the software reflects the information provided by another node. The process of connections to various nodes forms one single way. The network of nodes is called WWW –World Wide Web.

We have taken the thesaurus (information retrieval) of the Institute of Scientific Information for Social Sciences of the Russian Academy of Sciences (INION RAN) [2; incl. 1; 8] and have designed the following classifier (rubricator – classified subject index for the thesaurus of scientific metalanguage; subcategory - Economics) in Economic Science. The division has 5 subdivisions. 1. General lexis. 2. History of Economics. History of Economic Activity. 3. Economic Sciences. 4. Related sciences. 5. Others.

Subdivision 1. ‘General lexis’ includes a list of basic notions. It should preferably contain the notions of an economic aspect, social aspect, material factor, technology.

Subdivision 2. ‘History of Economics. History of Economic Activity’ besides the main list on notions should preferably contain ‘Civilization’, ‘Civilization approach’. We suggest including the following subgroups of information resources into subdivision 2: 2.1. World economic history. 2.2. Economic history of primitive society. 2.3. Economic history of feudal society. 2.4. Early modern economic history. 2.5. New time economic history. 2.6. History of economy of civilizations.

Subdivision 3. ‘Economic science’ should embrace the following subdivisions: 3.1. Economic theory. 3.2. History of economic ideas. 3.3. Spatial economy. 3.4. Dynamic economy. Intertemporal exchange. 3.5. Economic statistics. 3.6. Special and branch economics. Cross-industry economics. 3.7. Managing the economy. Managing the enterprise, managing cross-industry complexes, managing territorial complexes. 3.8. Economics of scientific and technological progress and modernization of national economy. 3.9. Global economy.

Information resources group 3.1. ‘Economic theory’ can embrace the following aspects (research items that have a complex structure): 3.1.1. Subject matter and

method of economic research. 3.1.2. Teaching economic sciences. 3.1.3. Bibliographical indices. 3.1.4. Reference books. 3.1.5. Course books. 3.1.6. General economic theory.

Subdivision 3.1.6. 'General economic theory' can embrace: Macroeconomy, microeconomy, nanoeconomy (economy of a person and household).

Groups of information resources 'History of economic ideas', 'Spatial economy', 'Dynamic economy. Intertemporal exchange', 'Economic statistics' do not need subdivision into subgroups.

Information resources group. 3.6. 'Special and branch economics. Cross-industry economics' includes the following subgroups: 3.6.1. Concentration, specialization, integration; 3.6.2. Material and technical resources. Capital assets. Current capital. 3.6.3. Fixed capital formation. Capital investments. 3.6.4. Labour: human resources, productivity. 3.6.5. Products, reserves, industrial engineering. 3.6.6. Production cost. Net cost. Product cost. 3.6.7. Finance. Credit. Money turnover. Monetary system. 3.6.8. Economics of environmental protection. Environmental economics. 3.6.9. Industrial economics and industrial branch economics. 3.6.10. Agricultural economics. 3.6.11. Economics of agro-industrial complex. 3.6.12. Economics of defence complex. 3.6.13. Transportation economics. 3.6.14. Communications economics. 3.6.15. Economics of Computer Science. 3.6.16. Construction economics. 3.6.17. Trade economics. Food services economics. 3.6.18. Hotel industry economics. Tourism economics. 3.6.19. Housing services economics. Economics of household services. 3.6.20. General issues of economics of enterprise. 3.6.21. General issues of branch economics. 3.6.22. Economics of medicine. 3.6.23. Economics of culture. 3.6.24. Economics of science. 3.6.25. Economics of education. 3.6.26. Economics of scientific and technological progress and modernization of natural economy. 3.6.27. World economy. 3.6.28. Economy of industrialized countries. 3.6.29. Economy of developing countries. 3.6.30. Economy of depressive countries. 3.6.31. Foreign economic activity of enterprises. Information resources group 3.7. 'Managing the economy. Managing the enterprise, managing cross-

industry complexes, managing territorial complexes' can contain the following subgroups: 3.7.1. Management. Planning. Forecasting. Power. Accounting. Marketing. Logistics. Personnel management. Finance management. 3.7.2. Business administration. 3.7.3. Economical statistics at enterprises and industrial sectors. 3.7.4. Accounting. Accounting procedures at enterprises and at industrial sectors. 3.7.5. Managing foreign economic activity at enterprises. Managing joint-ventures. 3.7.6. Government control of economy. 3.7.7. Economic basis of conflicts. 3.7.8. Managing science and technological progress and modernization of natural economy. 3.7.9. Salaries and bonuses at industrial enterprises and organizations. 3.7.10. Economic policy. 3.7.11. Innovative policy. 3.7.12. Regional economy. 3.7.13. Economic analysis. 3.7.14. Economic mechanism. 3.7.15. State budget. 3.7.16. Municipal budget. 3.7.17. Regional budget. 3.7.18. Non-budget funds. 3.7.19. Social insurance. 3.7.20. Managing an enterprise. Corporate planning. Delegation of authority. Marketing. Logistics. Types of enterprises depending on types of ownership and economic management. Crisis management. 3.7.21. Foreign economic policy. Other issues of economic and business management.

By using the suggested thesaurus you can efficiently get relevant and consistent search results. The suggested thesaurus can help in devising a search programme, which would not only provide the user with the information about resources that usually or occasionally contain key words, but give a list of semantically linked terms, descriptors, definitions, illustrations, interpretations, lemma, explanations, notions, clarifications, comments, rendering, formulizations, digressions and excerpts. In such a thesaurus hyperlinks can be constructed in such a way as to prompt the user what other vocables can be used in search (for example, an antonym, a hyperonym, a hyponym, contextual synonym, lexico-semantic variant, meronym, holonym).

2. Classified catalogue of the thesaurus of economic metalanguage

The idea behind the suggested new classification of economic sciences is about expanding capabilities of modern retrieval systems. Thus, to support the tendency we have conducted an experiment and have designed a classified catalogue and an economic thesaurus.

In the classified catalogue of economic metalanguage thesaurus descriptors are divided into rubrics, which correspond to the branches of economics. There are subdivisions within divisions. A particular descriptor can be included into several subdivisions. Subdivisions within divisions and descriptors within subdivisions are classified in alphabetical order.

In general, the classified catalogue ensures thematic (ideographic) coverage of an economic thesaurus and covers nearly the whole thematic structure of economics as a branch of science.

Classified catalogue is used as the main entrance to the hypertext thesaurus (information retrieval) of economic metalanguage to search for descriptors (headings of entries) in thematic divisions and subdivision of economics and for various kind of search (accurate, loose) for relevant information.

Rubrics and divisions are provided in the upper case, subdivisions – in the lower case; key words of a division are provided in parenthesis.

When designing the systematic catalogue we have taken into consideration dictionaries of financial, economic, statistical terminology, economic encyclopedias, biographies of heads of big companies, enterprises and states [M.V. Lomonosov, 1869; I.S. Vavilov, 1856; A.I. Ipatov, 1900; A.N. Efimov, 1962-1965; A.V. Rumyantsev, 1972-1988; E.F. Boriso, 1972; M.G. Lapusta, P.S. Nikolskiy, 2002; N.D. Naidenov, V.P. Chesnokov, 2007; A.G. Gryaznova, 2008; M. Korolev, 1989, etc.]

GENERAL LEXIS

(economic relations, production forces, methods of economic theory, economic schools and divisions, scientific economic communities, scientific ties, literature reviews, correspondence, directives, manuscripts, reference books, encyclopedias, anthologies)

GENERAL ISSUES

History and present-day economy

(Anarchism. Hedonism. Ancient Greek economic doctrines. Institutionalism. Historic school. Keynesian theory. Cynicism. Classical school of economics. Marxism. Mercantile system. Neo-Keynesian theory. Ethical school. Post-modernism in economics. Sociological school. Utopian socialism. Physiocrats. Civilization approach in economic research. Aztech economic views. Incan economic views. Economic concepts of religious movements. Energy school. Managerialism. Golden ratio school. Mathematical modeling in economics. School of neuro-linguistic programming in economics.)

Personalia – who is who in economic research, prominent researchers, heads of enterprises and economic departments, teachers of economic subjects.

Forums, congresses, conferences, symposiums

International community in economics and economic research

Teaching economics

Economics. Economic sciences

General theoretical problems.

Subject matter and methods of economic research

(approximation, aggregation, stochastic models, historic series, convex programming, geometrical methods, dialectics, graphic methods, disaggregation, business games, creating tables ‘Costs and Results Analysis’, historic approach, correlation analysis, optimality criterion, linear models, marginal analysis, exchange,

consumption, other conditions being equal, from simple to complex, cost, distribution, production, value approach, factorial analysis, economic and mathematical methods, economic laws, economic ties, economic relations, economic proportions)

Main Types of Public Production

(business agreement, asymmetry, auction, upstream integration, barriers to entry, product differentiation, duopoly, producer surplus, enterprise combining, monopoly, monopolistic competition, natural economy, non-price competition, uncertainty, exchange, communal economy, market economy, demand, offer, equilibrium price, transactions, economic operations, competitiveness, feudal economy, slave-owning economy, price competition, centralized economy).

Functions of economic theory

(cognitive function, methodological function, practical function, regulating function, function of exchange and transfer of best practices) economic philosophy (axiology, antimentalism, hermeneutics, intentionality, genuineness, cognitive linguistics, logical semantics, logical analysis, mentalism, thinking, scientific paradigm, cognition, content and form, universalia in economics, general economic laws, form and content, economics and mentality).

Economic laws

(universal organizational laws, law of the unity and struggle of opposites, law of supply and demand, law of value, law of diminishing returns, proportionality law, updating, speech units, linearity of speech, speech activity, oral speech)

History of economic mind

(absolute rent, transition period, national socialism, neo-Richardianism, exploitation)

Scientific and technological progress

(innovation, competition, scientific and technical cycle)

Metalanguage and economic terminology

(Godel, logic, metalinguistics, metascience, metatheory, metalanguage, incompleteness theorem, philosophy)

Fields and Methods of Economic Research

Microeconomy, macroeconomy, branch economy, spatial economy, temporal exchange economy, economic statistics, accounting, accounting organization, economic analysis, statistical materials, economic policy, management, concentration, specialization, capital stock, current assets, capital investments, investments, labour force, production, reserves, finances, economic crises, other economic problems, axiomatic method, anthropocentric method, behaviorism, probabilistic methods, gender approach, discourse, discursive analysis, classification of goods and services, quantitative methods, combinatorial methods, content analysis, statistical analysis, mathematical methods, methodology, research methods, modeling, field linguistics, historic approach, post structuralism, segmentation, semantic differential method, synergetics, system and structured methods, system and structural analysis, system approach, comparative method, socio-linguistic approach, comparative method, statistical analysis, structural and functional analysis)

Comparative Economic Research

(history of economics, relative chronology, synchrony and diachrony, comparative research, comparative method, comparative economic research)

Ontological Classification of Economic Systems

(classification, economic similarity)

Creation and Development of National Economies and World Economy

(wave theory, genealogical theory, monogenesis theory, evolution of economic systems, integration, stage classification of economies, evolution of economies)

Economic Divergence and Convergence

Economic Unions and Contacts

(adaptation, economic aspect of geopolitics, international economic relations, international economic unions, disintegration of national economy, borrowings)

Economy of Developed Countries, Developing Countries and Depressive Countries

(Kazakhstan economy, Russian economy, Somalia economy, the US economy)

Comparative Economic Studies

(comparing statistical indicators, index of labour productivity, human development index)

Branch Economics

(industrial economics, agricultural economics, transport economics)

The suggested thesaurus (information retrieval) in economic sciences is connected with the metalanguage of science and can help to better process user queries and update information resources.

Naturally, adaptation of information retrieval systems to the increasing information current via the thesaurus will not completely satisfy user requirements to accuracy and allocation of information resources. However, presenting information in the form of a thesaurus can be the first step towards it.

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