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The National GSBPM Glossary: Methodology and Practice

This study aims to contribute to the national statistical glossary compilation, namely a glossary supporting the Generic Statistical Business Process Model (GSBPM). The GSBPM is a standard framework that allows statistical authorities to use corporate and harmonized terminology for the statistical business process. In Ukraine, the implementation of the GSBPM in statistical practice puts forward the need for its terminological support. The glossary is a means of understanding among statisticians and contributes to professional vocabulary formation.

Statistical terminology today creates an independent terminological system. The system nature of statistical language is related to the professional limits and the interdependence of phenomena within these limits. As a subsystem of the general statistical system, the GSBPM has its vocabulary.

We argue a complex, non-linear, and dynamic interrelation between statistical business processes in the GSBPM. The business processes form some synergy and involve professional vocabulary for different business phases, implying a non-mechanical approach to glossary compilation.

According to studied international practice, there is no single approach to statistical glossaries construction and presentation. The choice of basic international standards is crucial to ensure the GSBPM methodology and quality.

We formulated several experience-based requirements and principles for the GSBPM glossary. Identified problematic issues may be useful for further work on statistical terminology. The progress in official statistics, both international and national, significantly affects this work's qualitative aspects. An essential factor in bringing national statistical language closer to international standards is undoubtedly the dialogue between the academic community and statisticians-practitioners.

The development of glossaries for the General Activity Model for Statistical Organizations (GAMSO) and the Generic Statistical Information Model (GSIM) is outlined as a prospective area of further studies.

Key words: glossary, GSBPM, statistical business process, official statistics, statistical term, term definition.

Introduction

The Generic Statistical Business Process Model glossary (from now on, GSBPM) is an essential part of the statistical standardization initiatives. The decision of the 66th Plenary Session of the Economic Commission for CES, held in Paris on June 26-28, 2019 [5], identified the urgent and prospective task for the official statistics to build a metadata glossary, an integral subsystem of which is the GSBPM glossary [7]. In the EU, the GSBPM glossary development became the next step to the Memobust project resulted in the Handbook on Methodology of Modern Business Statistics [10]. The Economic Commission for CES also envisaged that the standard glossary would be a centralized and ultimate source of terms and definitions for modern statistical models in the official statistics (Modern Stats models) to help identify and eliminate inconsistencies between statistical homographs and synonyms.

In Ukraine, implementation of the GSBPM in statistical practice also puts forward the need for its terminological support. Besides, the formation of glossaries in Ukraine is highly relevant due to the rapid and not always coordinated emergence of professional terminology, including statistical. Unlike in countries where the official language has a centuries-long history, many professional vocabularies in Ukraine are not well established and coherent. The GSBPM glossary thereby is a means of understanding among statisticians and contributes to professional vocabulary formation.

Accordingly, in 2020 the State Statistics Service of Ukraine (from now on, SSSU) initiated the GSBPM glossary project. The work was carried out under the National Academy of Statistics, Accounting, and Audit (NASAA). Under the requirements set out in Chapter 5 of Section V of Ukraine–European Union Association Agreement [3], the GSBPM glossary formation is an essential step towards implementing international standards into the national statistical

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practice. The key objectives of the GSBPM glossary are:

- collect a set of definitions relative to the GSBPM;
- facilitate the statistics production within the National Statistical System;
- enrich and improve the national statistical vocabulary;
- highlight the inconsistencies between international standards and national statistical practice.

There were three phases of the glossary project. The first phase was devoted to the inventory of international and national statistical dictionaries and glossaries and developing a glossary layout. The intermediary stage presented: 1) a terms list accompanied by the information sources, and 2) a glossary draft. The final phase ended with a final version of the glossary.

This study presents an overview summarizing the experience gained during the project. The paper comprises several sections – introduction, the basic international standards, methodology, international practice, practical aspects, problematic issues, and a conclusion.

Basic International Standards

The GSBPM is not an independent standard, but it is closely related to other basic statistical standards. In 2015, the UNECE, Eurostat, and the OECD proposed a General Activity Model for Statistical Organizations (from now on, GAMSO) [6]. This model considers the division of the statistical organization's activities into four areas: strategy and leadership, capacity management, infrastructure, and production. The GSBPM describes the production part. Since July 2007, Eurostat has initiated the introduction of GSBPM as a European standard [18]. In February 2017, the CSSE (European Statistical System Committee) confirmed this model's inclusion in the list of European standards. The GSBPM (version 5.1) became a standard framework that allows statistical authorities to use corporate and harmonized terminology for the statistical business process. The GSBPM is an evolutionary model, the current version of which has been in effect since December 2013.

Another international standard directly related to the GSBPM is the Generic Statistical Information Model (from now on, GSIM) [8]. While the GSBPM describes statistical production processes, the GSIM (version 1.0) describes the information circulating between production processes [13].

Thus, the GSBPM describes the production subsystem of the GAMSO and aims to collect and transform information represented by the GSIM. The GAMSO, the GSBPM, and the GSIM are the essential standards for reforming official statistics. They provide statistical activities with mutual terminology, thus improving communications between statisticians within each statistical organization and statistical systems. All this increases the statistical activity efficiency. In a broad sense, it also means that

approaches to compiling and publishing the GSBPM glossary must comply with three groups of principles of the European Statistics Code of Practice: Institutional Environment, Statistical Processes, and Statistical Output [2].

Together with the international standard ISO / IEC 11179-4 Part 4: Formulation of data definitions [11], the three standards are vital in compiling the GSBPM glossary.

Along with the above and taking into account the relevance, we completed basic standards for the GSBPM glossary with the national version of GSBPM, adopted 25.05.2018 by the SSSU Commission for Methodology and Reporting Improvement [1], Handbook on Methodology of Modern Business Statistics [10], SDMX [14, 15], and Statistical Metadata in a Corporate Context: A guide for managers [16].

Methodology

The scientific approaches to ensure the glossary methodological framework are: systematics, parsimony, generalization and classification, empirical evidence, and evolution.

With GAMSO (version 1.2, 2019) and GSIM (version 1.0), GSBPM aims to provide a common vocabulary to support international cooperation and international exchange in the official statistics. It is a universal system that divides any statistical production operation into eight phases: needs identification, design, development, collection, processing, analysis, dissemination, evaluation. These phases themselves involve 44 sub-processes. That means that the glossary should cover the standard GSBPM structure of three levels: Level 0, statistical production process; Level 1, eight phases of the statistical production process; Level 2, 44 sub-processes in each phase.

An integral part of the glossary is the broad over arching processes' vocabulary covering and coordinating the statistical production elements. These processes are carried out at the organization's level to support the statistical activity and considered in the GAMSO, namely, quality management, metadata management, data management, process data management, knowledge management, and provider management [7].

We argue a complex, non-linear, and dynamic interrelation between statistical business processes. The GSBPM is a multilevel, open, and dynamic framework for organizing the statistical business process, i.e., according to the developers: "A statistical business process is a collection of related and structured activities and tasks to convert input data into statistical information. In the context of the GSBPM, organizations or groups of organizations perform statistical business processes to create official statistics to satisfy the needs of the users. The output of the process may be a mixed set of physical or digital products present-

ing data and metadata in different ways, such as publications, maps, electronic services, among others" [7].

However, the GSBPM should be applied and interpreted flexibly and not in strict order. The GSBPM identifies possible steps in the statistical business process and the interrelation between them that corresponds to a logical series of steps in most statistical business processes. The statisticians can combine the model' elements in a different order and circumstances. Some sub-processes require a return to them in other contexts, thus forming iterative loops. Thus, "GSBPM can be considered as a checklist of processes and sub-processes to ensure that all necessary steps are in place to identify all necessary «components» of the statistical production process" [7]. The GSBPM acts like a constructor to compose individual statistical business process structure. "In this way, the GSBPM aims to be sufficiently generic to be widely applicable and to encourage a standard view of the statistical business process, without becoming either too restrictive or too abstract and theoretical" [7].

The GSBPM is also independent of the data source and applicable regardless of the nature of the process: survey, administrative source, "mixed" source [7]. That is, the model is independent of the order of business processes and types of data sources.

While forming the terms of reference, the SSSU proposed a process sequence for the glossary formation. However, given the above, we rejected this approach. What is essential is not the sequence of processes but their universality and availability following the statistical system's update.

Also, the glossary should not unreasonably overrepresent specific statistical domains and data sources. Of course, the universality does not preclude some specialized terms and concepts narrowly focused on particular statistics.

This vision also means that the GSBPM vocabulary cannot a priori conflict with those for GAMSO and GSIM. Whether the statistical organization has a sectoral, functional, or mixed structure, the terminology selection, interpretation, and updating occur regardless of the organizational principle, type of information, and information sources.

By using such a universal approach, we mitigate the risk of both vertical and horizontal excess. Vertical excess is an unfounded repeated description of the same terms for different stages within a business process or various processes. To avoid an unreasonable repetition of a term, we list it once. If necessary, the terms may be accompanied by an extended definition, considering all the nuances relevant to the GSBPM. Horizontal excess refers to the too-narrow focus of the terminology within the processes, which tend to be interpreted differently by experts from various statistics domains.

The next methodological issue is the need for a clear distinction between glossaries and dictionaries and between the term and the concept. First, the list and the definitions of words in a glossary may not coincide with those provided in dictionaries. A glossary offers only such terms and descriptions that are relevant to the specific area of its application. In terms of etymology, any glossary is a collection of "glosses", i. e., foreign terms or particular words, accompanied by their explanations that correspond to the specified scope [19]. A glossary is a collection of terms and interpretations for a specific activity field (in our case, the GSBPM). Each word interpretation should be limited to the GSBPM relevance.

Second, while a concept deals with high-level abstraction, a term deals with abstraction and practical implementation. According to the Merriam-Webster Dictionary, "a term is a word or expression that has a precise meaning in some uses or is peculiar to a science, art, profession, or subject" [22]. While compiling a glossary, we face general scientific terms, national statistical terms, terms-equivalents, and international statistical terms. General scientific terms distinguish scientific wording from non-scientific ones. National statistical terms are specific to national statistical science and practice. Terms-equivalents are stable lexical units that match precisely the meaning of the word. International statistical terms are words or expressions that belong to a common foundation of languages similar in their statistical development. They are usually borrowed directly from the vocabulary used by the international statistical organizations. The Ukrainian statistical terminology foundations are much closer to European ones. Terms within each group require special treatment. Their identification, classification, and analysis contribute to the quality of a glossary.

We can say that the statistical vocabulary today forms an independent terminological system. The systemic nature of statistical language is related to the professional limits and the interdependence of phenomena within these limits. The statistical terminological system is composed of two subsystems: academic statistical speech and functional language. Although these two subsystems have pronounced features, they are overlapping. Both subsystems, theoretical and functional, are involved at different levels of the GSBPM. An academic terminology is systematic, as it undergoes a complex process of scientific verification. A functional language is more responsive to external evolutionary factors and, accordingly, more prone to ad hoc. In line with Thelen (2015), while translating foreign terms, we need to ensure interaction between theory-oriented (or systematic) terminology and translation-oriented (or ad hoc) terminology, from which they both, as well as the overall translation process, will benefit [17]. The same applies to the national vocabulary.

The principle of parsimony is as critical for compiling a glossary as for any scientific process. The parsimony principle requires choosing the most

straightforward explanation to fit the evidence, which means that among the possible terms and descriptions, the most acceptable are those involving the fewest entities, assumptions, or changes [21].

Another specificity of glossaries is their structure. A characteristic feature of glossaries is their alphabetical order. According to the Cambridge Dictionary, a glossary is an alphabetical list of difficult, technical, or foreign words along with their explanations [21]. The Larousse dictionary also defines a glossary as an alphabetical list of special terms [20].

We defined five essential principles for the GSBPM glossary compilation: compliance with the statistical standards, business-processes universality, terms relevance to the GSBPM, the parsimony of term selection and definition, and alphabetical organization.

International practice

A review of international practice allowed us to select and justify approaches to the GSBPM glossary compilation. We analyzed a total of 39 foreign websites with one or several types of statistical dictionaries or glossaries for the following characteristics: general issues; structure; access; searching; used attributes; language(s); term and term definition; coding; glossary size.

General issues. At the time of the study, specialized GSBPM glossaries' practice was not widespread in the official statistics. The standard way is to form general statistical glossaries as a subsystem of the metadata system, a subsystem of the methodology and classifications. Some international organizations create, in parallel, specialized glossaries. Specialized glossaries mainly focus on the needs of particular statistics or their theoretical aspects. The Memobust Glossary and SDMX Glossary are the most relevant to the GSBPM. There is no unified way of presenting statistical glossaries on websites.

Structure. The vast majority of glossaries have analphabetical system. Some international organizations and countries have a parallel presentation by theme (or a broad statistics domain). Sometimes several arching terms are also provided.

Access. Glossaries of all statistical services are freely available to all types of users. Usually, a glossary is part of the navigation subsystem of the organization's website. In some organizations, it is also possible to obtain an electronic version of the glossary.

Searching. The search engine corresponds to the glossary structure, providing automatic alphabetic search, followed by the possibility of manual searching for a specific term. In some cases, it is possible to search by free entering text in the search box. There is also a fairly common practice to select a term in the provided list. It is possible to search by topic if there is a thematic structure.

Used attributes. The standard attributes of any glossary are: "numbering", "term", and "term defini-

tion". International and some national glossaries also contain additional attributes such as "sources" and "contact details of the methodology responsible person". The SDMX glossary and the OECD glossary provide more attributes.

Language(s). Glossaries of international organizations are in English, while national glossaries are either exclusively in a country's language or are bilingual. In the case of multilingual countries, glossaries are multilingual as well. When the country is not English-speaking, the English version is always presented separately on the English website version. Some countries provide links to English-language versions of international organizations' glossaries. In some cases, for the English version, only a list of terms (index) is provided, while the national-language version contains all attributes.

Term and term definition. A selected term is usually given in the glossary once. Of all the possible synonyms, the glossary provides the most relevant term. The most common practice is to give one definition for a term.

Coding. Coding of statistical terms is not a common practice. However, in our opinion, it could provide additional convenience, especially when moving from one type of statistical glossary to another. Codes also create significant advantages in the formation of the conceptual component of the metadata database. A coding example is the "identification term" in the SDMX glossary.

Glossary size. Statistical glossaries are quite different in content and size. The lists range from a few dozen to several hundred terms.

Practical aspects

We filled the glossary with terms not once but in stages. We started forming a glossary core with the UNECE website's terms regarding the GSBPM, the Memobust Glossary, and SDMX Glossary. We also monitored compliance with GAMSO and GSIM. Next, we used words from other leading sources. Finally, we filled the dictionary with words from national methodological and legal documents, and national statistical dictionaries. We also monitored the use of Ukrainian terminology for conflicts with international standards.

In line with the objectives, methodological framework, and principles formulated for the GSBPM glossary, as well as given international evidence, we developed the following practical criteria for the GSBPM glossary:

- consistency with the general glossary principles;
- the possibility of further updating;
- accessibility and comprehensibility;
- convenience and ease of search.

The first requirement is in line with the above glossary principles: compliance with the international standards, business processes universality, terms relevance, the parsimony of term selection and

definition, and alphabetical organization. The second requirement means the system's openness, i.e., the ability to continually evolve in line with the evolution of the GSBPM, the GAMSO, and the GSIM and official statistics progress. The third and fourth requirements logically follow from the official statistics ability to meet user needs. This requirement is essential for extensive glossaries.

We undertook an inventory of the existing international and national statistical terms for their relevance to the GSBPM in redundant or missing words. The METIS working group [4; 9] proposed using the concept map to improve the MCV glossary [12]. The concept map was handy in compiling the GSBPM glossary whenever compliance with the standard terms was non-obvious or doubtful.

We prioritized international sources while selecting terminology and interpretations to ensure the principle of universality. When a chosen term is absent in international sources, we envisaged including the relevant Ukrainian terms.

We decided that each term should have a reference link to increase the information reliability. However, detailed references, such as author (s) and publication title, year of publication, publisher, and website, make the glossary cumbersome. Therefore, the glossary provides short references only, while a separate table presents all the reference details. This table can also give the above codes of terms to which a particular source refers, allowing the web-version designers to make automatic references. Each word has its four-digit code, consisting of a letter of the relevant section and three digits (for example, the first term's code is A001).

After processing, the current version of the glossary includes near 700 words. The references list comprises 137 sources, including 68 international sources and 30 author publications.

Problematic issues

We drew up problematic issues based on the gained experience. We attributed the main difficulties to the following groups:

- the adequacy of translation;
- homographs and synonyms;
- the professional familiarity with particular terminology;
- the cultural and historical divergence between the national and the international statistical vocabulary.

As there is a lot of academic literature devoted to translating special terms, we will not delve into this issue. The translation problems covered in the professional literature are similar to those we faced. We distinguish two groups of problems: lexical and semantic, and cultural. The lexical and semantic issue covers terminology alternatives, neologisms, semantic gaps, synonyms, and antonyms, etc. The cultural issue arose from historical differences. Based on experience, the quality of the translation of special terms can be affected by such factors:

- the interpreter's personal experience;
- a balance between human and machine translation:
 - lack of national practices in the field.

With this in mind, the translation of terms should not be mechanical. In addition to the standard techniques, the translation has to rely, among others, on lexical methods such as transliteration, description of meaning, and calque (or loan translation). "Transliteration is a technique of converting a text from one script to another that involves swapping letters in predictable ways" [24]. The description of meaning is useful when there are no term equivalents in the language of translation. The calque technique is helpful in the translation of complex terms. The calque means borrowing a word or phrase from another language while translating its components to create a new lexeme in the language of translation [23].

Evidence-based recommendations for the successful translation of professional terms are as follows:

- have good knowledge of terms in a particular domain;
 - avoid "misleading" wording;
 - avoid synonymous use;
- use a term that covers the essential features of a concept;
- avoid looking for a foreign word if the language of translation already has a lexical unit with the same meaning;
 - use international terms to fill terminological gaps;
 - use relevant domestic standards;
- while translating neologism, consult a specialist in this domain, and if necessary, use the above lexical techniques.

An example of the translation issue is the wording of different levels of the GSBPM. In the English original, we have the following: Level 0, the statistical business process; Level 1, the eight phases of the statistical business process; Level 2, the sub-processes within each phase [7]. In the English version, we deal with the overall production process, process phases, and sub-processes of each phase. The parallel use of the term "process" for both Level 0 and Level 1, adopted in the Ukrainian language, creates some confusion and misunderstanding. But because the current national version of the GSBPM contains just such terminology, the glossary includes it.

The issue of homographs and synonyms overlaps with the above problem, but it is not always related to translation. A homograph is a word from a group of words with the same designation, but with a different interpretation, often with a different pronunciation. With the same accent, such a word is both a homophone and a homonym. Borrowing and professional adaptation of such words can cause systematic differences in interpretation and provoke misunderstandings between international and

national professionals when using the same term in different areas with different meanings.

Synonyms, in turn, create an uncontrollable variety of statistical terms used to denote the same phenomenon. Linguistic richness can be considered as an advantage. However, it complicates experts' cooperation and understanding, both internationally and nationally, from a practical perspective. The glossary should offer the most appropriate match of the term among all possible.

Issues of homographs and synonyms are regular ones in compiling the glossary. The widespread foreign borrowing of statistical terminology, which is not yet stable enough, is amplified by the Ukrainian terminology instability and active terminology discussion between statisticians and scholars. This process is far from complete. Obviously, we need to update the list of terms and their definitions regularly.

The statisticians' familiarity with particular terminology depends on national adaptation and implementation of best statistical practices. First of all, it concerns mathematical statistics, modeling, sampling techniques, IT technologies, etc. The glossary aims to support the entire business process and covers several related activities supporting the statistical production. Accordingly, the glossary contains a lexicon, understandable to specialists in a particular domain. Examples of terms that provoke discussions are data security, all distance terms, statistical hypotheses, matching, study parameters, statistical estimates, adjacency matrices, digraphs, log information terminology, q-percentage, and p-percentage, various models, etc. There have been some hesitations about the international routine statistical methods and practices that had not vet been well-established in Ukraine. However, based on perspectives, we considered such terms also.

The gaps between the national and international statistical vocabulary are primarily rooted in different statistical schools. Internationally we deal with the Anglo-Saxon and European statistical tradition. The Soviet statistical heritage widened the gap we have in Ukraine with little in common with the Anglo-Saxon or European schools.

However, due to international cooperation and adaptation of international statistical standards and techniques, the old terminology has gradually given way to the international one. The number of standard terms is continually increasing. Given this fact and the glossary purpose, we prioritized the

international practice and, if necessary, adjusted the national vocabulary, not vice versa.

The choice also arose when we faced the same term in international sources and the Ukrainian legislation. In most cases, these definitions do not contradict each other but still have specifics. We can ignore neither international sources nor laws. In such cases, we presented both descriptions, one below the other, with relevant references.

Conclusion

The statistical production process organization requires appropriate conceptual and terminological support. The GSBPM represents a standard framework that allows statistical authorities to standardize the business process and harmonize professional vocabulary. We argue a complex, non-linear, and dynamic interrelation between statistical business processes. Also, the GSBPM terminology has integral links with the GAMSO and the GSIM standards.) All the above require a creative approach to glossary compilation.

However, the international practice shows that statistical glossaries' compilation has not been standardized, thus complicating the optimal national solution choice. The experience reveals the complexity of the GSBPM glossary compilation, caused by factors related to adequacy of translation; homographs, synonyms; familiarity of domestic statisticians with up-to-date terminology; differences between the national and international statistical vocabulary, rooted in tradition, statistical practice, and legislation. The dynamism of international statistical language has an impact on the national professional vocabulary.

The study also showed that in terms of progress, the process is reciprocal. On the one hand, progress in the glossary compilation helps to harmonize and standardize terms. On the other hand, the glossary improvement depends on the progress in official statistics. This being born in mind, the GSBPM glossary should remain an open evolving system. A crucial factor in bringing the national statistical terminology closer to international standards is undoubtedly the active dialogue between the academic community and practical statisticians.

To conclude, the glossary will support not the statistical system as a whole but the GSBPM. Many terms not included in it refer to other components of the GAMSO and the GSIM. It follows that a prospective area of studies can be related to working out glossaries for the GAMSO and the GSIM.

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Національний глосарій із супроводу GSBPM: методологія та практика

Метою цього дослідження є здійснення внеску у практику побудови національних статистичних глосаріїв, зокрема глосарію із супроводу Національної моделі статистичного виробництва (Generic Statistical Business Process Model, GSBPM). GSBPM створює засади для гармонізації професійної термінології на всіх етапах статистичного виробництва. Імплементація GSBPM в Україні викликала потребу у відповідному термінологічному супроводі. Глосарій із супроводу GSBPM є водночас і засобом порозуміння між статистиками, й інструментом удосконалення професійної термінології.

Сучасна статистична термінологія є самостійною термінологічною системою. Системний характер статистичного словникового фонду зумовлюється професійними межами і незалежністю феномену у встановлених межах. Як підсистема загальної статистичної системи, GSBPM утворює власну термінологію.

У статті обґрунтовується комплексний, нелінійний і динамічний зв'язок між статистичними виробничими процесами. Виробничі процеси в офіційній статистиці формують певного роду синергію й описуються професійною термінологією на кожному етапі виробництва. Це вимагає виваженого, а не механічного підходу до укладання глосарію.

Як свідчить міжнародна практика, на сьогодні не існує уніфікованого підходу до побудови та представлення статистичних глосаріїв. Для забезпечення методологічного та якісного рівня глосарію вирішальним є вибір відповідних міжнародних стандартів.

Зважаючи на отриманий досвід, у статті сформульовано вимоги та принципи до побудови GSBPM глосарію, а також проблемні питанні. Дослідження показало, що прогрес у практиці офіційної статистики як на міжнародному, так і на національному рівнях суттєво впливає на якісні аспекти глосарію. Суттєвим фактором наближення національної статистичної термінології до міжнародних стандартів є діалог між статистиками – науковцями і практиками.

Як актуальний напрям подальших досліджень окреслено розробку глосаріїв для національної моделі діяльності для статистичних організацій (GAMSO) та національної моделі статистичної інформації (GSIM).

Ключові слова: глосарій, GSBPM (Національна модель статистичного виробництва), статистичне виробництво, офіційна статистика, статистичний термін, визначення терміна.

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