Analysis of Term Formation in Lithuanian, Russian and English Terminology Works

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KEYWORDS: terminology, term-formation, ways of term formation, means of term formation, sources of terms, contrastive analysis

INTRODUCTION

The article presents a contrastive research of approaches to the analysis of ways and means of term formation as discussed in Lithuanian, Russian and English terminology works. The research focuses on an overview of various classifications of typical linguistic means of term formation presented in terminology works in Lithuanian (Keinys 1980, 2005a; Gaivenis 2002, 2014), Russian (Даниленко 1977; Лейчик 2009; Суперанская, Подольская, Васильева 2005, 2012; Гринев-Гриневич 2008) and English (Sager 1990, 1997, 2004; ISO 704:2009 (E)).

Term formation as a process is usually consistent with the processes of word formation used in a particular language. Nonetheless, term formation differs from word formation in the sense that, as a rule, it is a deliberate and conscious activity rather than a spontaneous process. Moreover, term formation is a broader notion as it encompasses formation of both words and phrases. The result of the former process is one-word terms, while the latter results in multi-word terms.

The Lithuanian terminologist Stasys Keinys claims that terms are created and standardised consciously (Keinys 1980: 60). According to St. Keinys, terminology is a part of the standard language, however, it is in some aspects distinct and independent of it. On the one hand, terminology is consistent with the general trends in the language development; on the other hand, it is characterised by specific features, certain requirements and development (Keinys 2005g: 231).

The idea that term formation is a regulated, controlled and conscious activity is also discussed by Russian linguists, such as Valerija Danilenko (Даниленко 1977: 91, 93), Vladimir Leitchik (Лейчик 2009: 62), Aleksandra Superanskaja, Natalija Podolskaja, and Natalija Vasiljeva (Суперанская et al. 2012: 194). According to V. Danilenko, term formation in the domain of the language of science relies on the system of word-building of the Russian standard language. Nevertheless, there is a number of features that distinguish term formation in the language of science and word-building in the standard language and the fact that terms are created purposefully and consciously is one of those features (Даниленко 1977: 90–97).

Juan C. Sager also shares the view that term formation is a "conscious human activity and differs from the arbitrariness of general word formation processes by its greater awareness of pre-existing patterns and models <...>" (Sager 1997: 25). This process not only relies on the existing lexical elements and combines them in particular ways, but can also be described in terms of patterns according to which these elements are combined, which in turn can be used for subsequent term formation (ibid).

Since term formation is a deliberate, conscious, controlled and regulated process, it is necessary to be aware of the typical patterns and models of formation of new words in a particular language to be able to create new terms and evaluate their systematicity and correctness. Thus the aim of the research is to review the major approaches to the analysis of ways and means of term formation in Lithuanian, Russian and English and to conduct a contrastive analysis thereof. By the term *ways of term formation* we mean the use or modification of internal/external sources of term formation while the term *means of term formation* in the article refers to specific types of term formation, e.g., terminologization, transterminologization, affixation, compounding, conversion, direct borrowing, loan translation, etc. The article analyses and compares the main criteria applied by terminologists for classification of term formation patterns with the aim to reveal similarities and differences of term formation analysis in different languages.

CLASSIFICATION OF WAYS AND MEANS OF TERM FORMATION IN SOME WORKS OF LITHUANIAN TERMINOLOGISTS

This section presents analysis of the works of two most prominent Lithuanian terminologists Stasys Keinys and Kazimieras Gaivenis who founded the basis of modern Lithuanian terminology. It also presents

some ideas from the works by Alvydas Umbrasas who investigated the Lithuanian legal terminology and its historical development.

The Lithuanian terminologists distinguish three ways of term formation: 1) using the existing vocabulary of standard language and dialects, 2) creating new words (neologisms), and 3) borrowing terms from other languages (Gaivenis 2002, 2014; Keinys 2005a). It is noteworthy that the first two ways of term formation are based on internal sources, meanwhile the third one relies on the use of external sources.

Using the existing vocabulary of standard language and dialects as a way of term formation is based on the use of vocabulary of native origin. It means that either a word which has already existed in the language or its dialect is terminologized, or a term which has already existed in another terminological field is transterminologized (Keinys 2005g: 231). Terminologization of a word from the general language or its dialect can be achieved in two ways: its lexical meaning is either extended or narrowed (Gaivenis 2002: 52–53). In this case the content, use and valency of terminologized words is usually changed. When words of the general language or its dialect are used as terms, they usually acquire new elements of meaning, which they do not have in the general language (ibid), e.g. *banga* 'wave' ('waves of a sea/a lake' → 'radio waves').

The majority of terms which consist of a single word and are simple in structure, in fact have been terminologized words of the general language or its dialect. Moreover, the mere fact that a term is complex in structure does not mean it has been created as such by means of word-building. As K. Gaivenis claims, there are cases when terms with a complex structure (i.e. they are formations) cannot be attributed to the category of terms created by means of word-building, because in fact they were terminologized, i.e. the word as such was formed in general language (or its dialect) and then it was used as a term (Gaivenis 2002: 56). Thus it might be quite difficult to establish whether a term has been formed as a result of the process of word formation or is a terminologized or transterminologized word. One of the criteria which could help here is taking into consideration the field of science and the history of development of terminology of that particular field. Nonetheless this criterion of 'newness' of a term is not quite reliable, because the same means can be used to create a new word in different locations where the language is spoken and at different periods. Even the fact that a word existed in the past and was

used in some historic document does not signify that the word was taken from that old source and not created as a new entity (Keinys 2005d). St. Keinys suggests that all terms that can be synchronically viewed as formations should be treated as a result of word formation rather than terminologization (Keinys 2005d: 22). He gives two arguments for this position: 1) in many cases it is impossible to establish whether a term was created as a neologism, or was taken from the general language; 2) terms which were formed on the basis of ordinary words nevertheless reflect certain word formation types, thus it would be inaccurate not to consider them as representatives of those types of word formation (Keinys 2005d: 22; Keinys 2005e: 113). Alvydas Umbrasas, who analysed Lithuanian legal terminology used in the period from 1918 to 1940, also shares this view and does not distinguish between terms of complex structure as terminologized words and terms of complex structure formed for specific purposes; his approach is formal and he attributes all terms of complex structure (derivatives and compounds) to the same category (Umbrasas 2010: 67-68). Therefore, in the works of St. Keinys and K. Gaivenis words of complex structure are most often ascribed to the second category of term formation – creating new words (neologisms).

Creating new words (neologisms) on the basis of the existing words in accordance with all main types of word formation is another productive way of creating new terms in Lithuanian. There are four main means of term formation in Lithuanian: prefixation, suffixation, flexional derivation and word compounding (Gaivenis 2002: 54; Keinys 2005g: 232; EC 2006).

According to St. Keinys, who conducted an extensive analysis of term formation means in different fields of science, the majority of terms are formed by means of suffixation, most of which are deverbal. There are several characteristic features of terms formed by means of suffixation, namely, they are usually abstract nouns, they lack emotional connotation, and quite a lot of them are hybrids (Keinys 2005d). Hybrids, which are terms that consist of a foreign base and native suffix, are analysed as derivatives and attributed to the same group as formations of native origin (Keinys 2005d: 75). However, A. Umbrasas, who applies the etymological criterion as a starting point, distinguishes hybrids as a separate category, which are distinct from terms of native origin formed by means of suffixation (e.g. *kontraban-dininkas* 'smuggler' (← *kontrabanda* 'smuggling' + a native suffix *-ininkas*), and discusses such means of term formation as a subtype of term formation based on elements of foreign origin (Umbrasas 2010: 132-133).

One more means of formation which is very often used to create new terms in Lithuanian is compounding. St. Keinys claims that compounding is the second most productive means of term formation after suffixation and is quite popular in certain areas of professional language (Keinys 2005c: 129). The fact that compounding is so productive in term formation can be accounted for by the necessity to refer to a complex concept. Moreover, compounds comply with such vitally important requirements for terms as accuracy, clarity and conciseness. Although these requirements for terms can be met by using a multi-word term, one-word terms are more convenient to use and can be created as relatively short generic names without using attributives. The most usual parts of speech used to create compounds in terminology are a combination of two nouns, a combination of a noun and a verb, and a combination of an adjective and a noun (Gaivenis 2002; Keinys 2005c), e.g. *medsraigtis* 'screwnail' (*medis* 'wood' + *sraigtas* 'screw'), *vandentiekis* 'water-supply line' (*vanduo* 'water' + *tiekti* 'to supply').

Another quite productive means of term formation, which is peculiar to Lithuanian, is flexional derivation. In contrast to English, where flexion serves only as a functional affix, in Lithuanian it can be used for derivation. As a means of word formation, flexional derivation is very similar to suffixation in nature, derivational meaning and form (Keinys 2005b). Terms formed by means of flexional derivation are very convenient to use because of their simple structure. Thus flexional derivation could be used more extensively as a means of term formation (Keinys 2005b). The majority of terms formed by flexional derivation are deverbal and deadjectival, whereas nouns, pronouns and numerals are very rarely used as the derivation basis, e.g. *sąnaudos* 'consumption, expenditure' (← *sunaudojo* 'used').

A relatively less productive means of term formation in Lithuanian is prefixation, because it is used to form denominal nouns only (Keinys 2005e); in contrast, suffixation and flexional derivation are used to form deverbal, deadjectival and denominal nouns. Nonetheless, the role of prefixation in term formation is rather significant (Keinys 2005e), e.g. *įtėvis* 'adoptive father' (← *į* + *tėvas* 'father'), *nedarbas* 'unemployment' (← *ne* 'no' + *darbas* 'work').

The last way of term formation discussed in the works of the Lithuanian terminologists is borrowing of terms from other languages. The process of borrowing of a concept together with the term which signifies that concept is quite usual in language in general and in terminology science

Liudmila Mockienė | *Analysis of Term Formation in Lithuanian,*
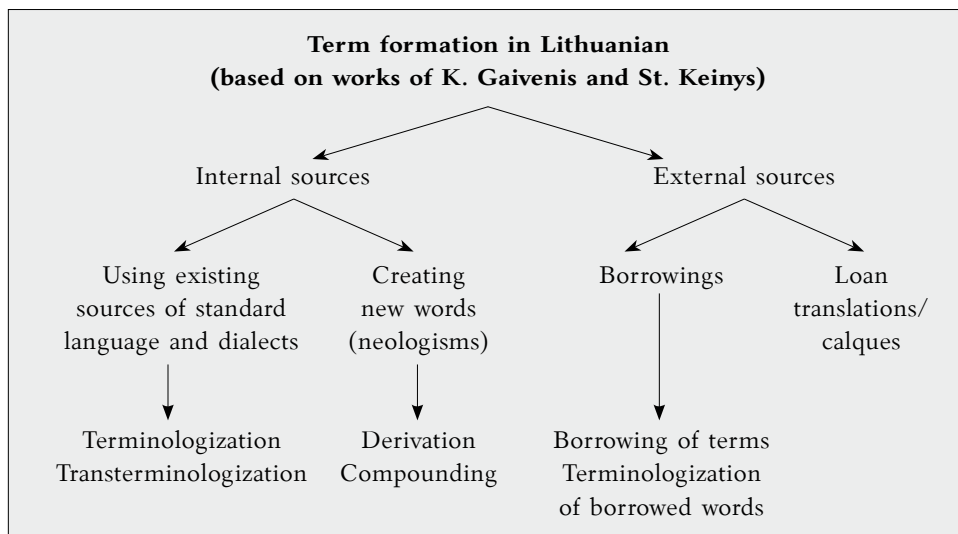Sigita Rackevičienė | *Russian and English Terminology Works*

specifically (Keinys 2005g). As K. Gaivenis claims, it is rather hard to avoid borrowings in terminology, besides it is not always necessary to do that (Gaivenis 2002: 57). What is necessary is to prevent overuse of borrowings in cases when they may supersede the existing terms of native origin, and, in addition, borrowings should conform to the rules of phonology, morphology and spelling of the Lithuanian language. Borrowed terms can be classified according to the degree of their assimilation into three groups: 1) old borrowings; 2) international words; and 3) barbarisms. Old borrowings have been absolutely assimilated and adapted to the language system, e.g. *stiklas* 'glass' (Gaivenis 2002: 58). In terminology they are not considered as real borrowings, in fact they are terminologized words of general vocabulary. Another category, international words, serve as terms of different fields of science. They have been borrowed into Lithuanian mainly from classical languages, such as Greek and Latin, either directly or through intermediary languages, e.g. *hipoteka* 'mortgage' (from Greek), *respublika* 'republic' (from Latin). The last category, barbarisms, are words which do not comply with the norms of the language (Gaivenis 2002: 57). Barbarisms never become part of standardized lexis. It was also observed that the distribution of borrowings in different fields of terminology is uneven. It is argued that the amount of borrowings in the latest scientific and technical branches of terminology is higher than in fields which have long traditions and rely largely on the indigenous vocabulary (Keinys 2005f).

St. Keinys also discusses loan translations/calques (Keinys 1980: 92–96). Most of such terms do not comply with the norms of the Lithuanian language and are not recommended for usage. Those which conform to the norms of the language and are formed on the basis of a productive model of word-formation are also often problematic as it is often difficult to determine whether a term is a loan translation or a native formation. Similarity of the structure of a word in several languages does not necessarily indicate an instance of loan translation. Most often such terms are perceived as native formations (Umbrasas 2010: 134).

The Lithuanian terminologists classify terms according to their formal structure into one-word terms and multi-word terms. One-word terms may be further classified according to their structure into simple and formations, whereas multi-word terms are grouped according to the number of constituent words (Keinys 1980: 16-17; Gaivenis 2002: 17) and are analysed according to their origin and the syntactic relation of words within the term (Umbrasas 2010).

Both one-word terms and constituents of multi-word terms are formed according to the same principles (using internal or external sources and various means of term formation) which are summarized in Scheme 1.

Scheme 1. Classification of the main ways and means of term formation in Lithuanian (based on works of K. Gaivenis and St. Keinys)

Term formation in Lithuanian (based on works of K. Gaivenis and St. Keinys)

Internal sources — External sources

Internal sources:
- Using existing sources of standard language and dialects → Terminologization / Transterminologization
- Creating new words (neologisms) → Derivation / Compounding

External sources:
- Borrowings → Borrowing of terms / Terminologization of borrowed words
- Loan translations/ calques

To sum up, Lithuanian scholars, such as K. Gaivenis and St. Keinys, support the view that the main source of terms should be internal: either the native language, i.e. the general vocabulary or its dialects, or the native means of word-building. Thus the basis of term formation in Lithuanian is semantic means (terminologization of words of the native language and old borrowings), morphological means (word-formation) and syntactic means (multi-word terms).

CLASSIFICATION OF WAYS AND MEANS OF TERM FORMATION IN SOME WORKS OF RUSSIAN TERMINOLOGISTS

This section presents analysis of the works of the Russian terminologists V. Danilenko, M. Leitchik, A. Superanskaja, N. Podolskaja, N. Vasiljeva, and Siergiej Grinev-Griniewicz.

Russian terminologists, like the Lithuanian terminologists, usually distinguish three main ways of term formation. The first two rely on the use of internal sources, namely, the use of an existing word of the language (i.e. either terminologization of a word of the general vocabulary or trans-

terminologization of a ready-made term from one field to another) and term formation by word-building means and syntactic means; whereas the last one is based on the use of external sources, namely, borrowing a term from another language by adapting it phonetically and morphologically to the norms of the language (Лейчик 2009: 81–84; Суперанская et al. 2012: 194, 203).

A. Superanskaja, N. Podolskaja and N. Vasiljeva claim that although there is a more extensive use of terminologization of words of the general language in certain fields, the dominant means of term formation is word-building (Суперанская et al. 2012: 201). They suggest to combine two parameters when designing a classification of ways terms are formed, namely, the source language (native vs. foreign) and the lexical principle which is used as the basis to form a term (a ready-made word vs. an intentionally created word) (Суперанская et al. 2012: 196). This would result in a scheme of ways of term formation, which, as the authors claim, is of a very general character, as it does not include transterminologization (see Scheme 2).

Scheme 2. Classification of the main ways and means of term formation in Russian (based on works of A. Superanskaja et al.)
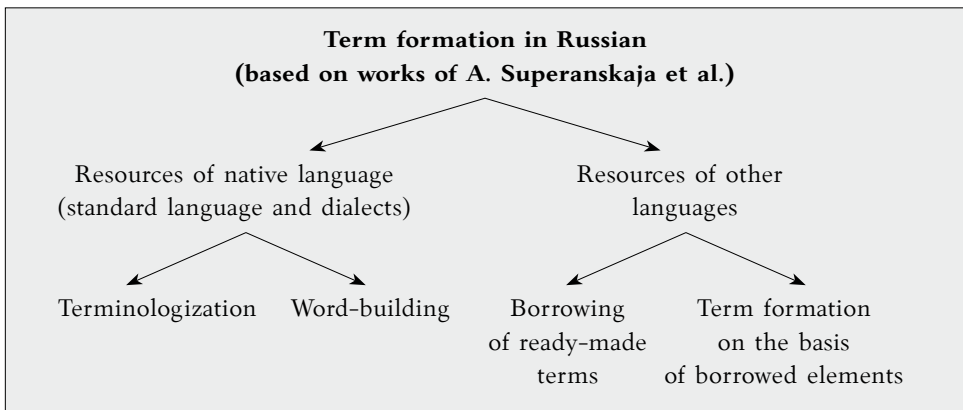
Similarly, V. Leitchik also distinguishes three ways of term formation, namely, formation of terms on the basis of resources of the native language by word-building and syntactic means; terminologization of words of non-special (standard language and dialects) and special vocabulary; and borrowing of terms from other languages where they were created as terms or borrowing words and terminologizing them (Лейчик 2009: 81–84).

As V. Leitchik notes, although the models of term formation are the same as the means of word-building of the general language, some of them are more productive, whereas others are less. When classifying terms, first, he distinguishes one-word and multi-word terms. Although productivity of composition as a means of word-building is not that high in Russian, V. Leitchik observes a general trend of using two-word and three-word term phrases (especially in the domain of informatics) and even four- or five-word terms (especially in the domain of philosophy). The constituents of the majority of multi-word terms in Russian are nouns and adjectives. A combination of several nouns can be used with or without prepositions, thus nouns can be dependent on other nouns (Лейчик 2009: 48–62).

Scheme 3. Classification of the main ways and means of term formation in Russian (based on works of V. Leitchik)
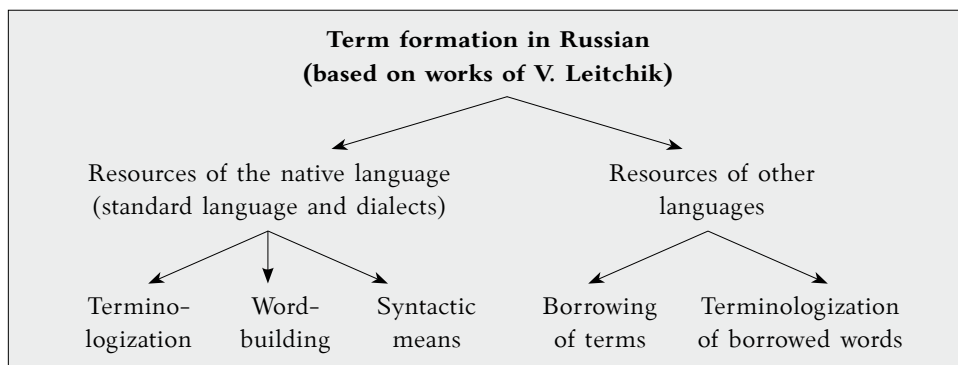
The two previously discussed classifications differ in the approach to borrowings. Alongside the process of borrowing ready-made words, A. Superanskaja et al. also distinguish term formation on the basis of borrowed elements. The position of the latter is not clear in V. Leitchik's classification. However, alongside the process of borrowing terms he distinguishes the process of terminologization of borrowed words of foreign general vocabulary, which means, that those borrowed words were not used as terms in the source language and became such only in the target language.

Another distinguished Russian linguist, V. Danilenko argues that in essence terms are formed on the basis of words of general and special vocabulary in accordance with all structural types of words that are characteristic of a particular national language (simple words, derivatives and compound words). She distinguishes the same means of naming concepts

in terminology which are actively used in the general language, i.e. semantic, syntactic and morphological means of word formation (see Scheme 4). The main difference is that word-building models and morphemes in terminology as a rule exhibit a greater degree of semantic specialization than in the general language (Даниленко 1977: 89–97, 113–116).
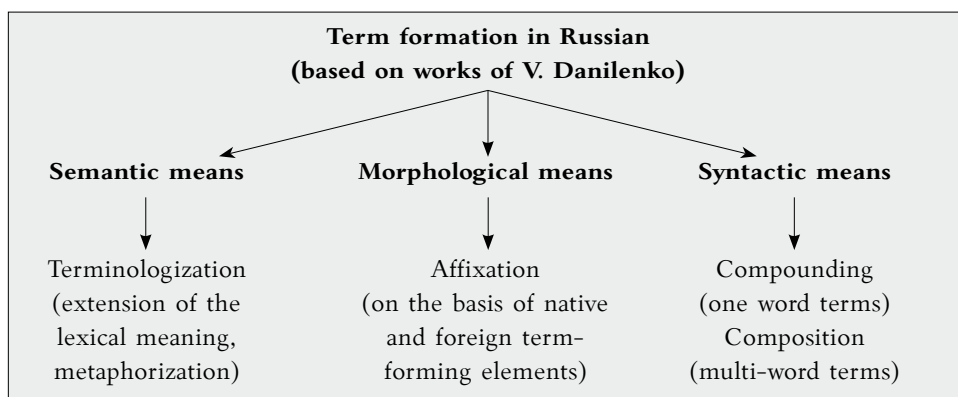
The semantic means of term formation is paramount in the language of science. Historically, it was one the first means used to form new terms and ever since has served as a permanent and indispensable source for terms. Moreover, the semantic means of term formation is characterised by a number of advantages over other means, as terms formed by means of terminologization are usually short and easy to remember. The semantic means of term formation differs from semantic word formation in the standard language, because in the latter semantic changes are gradual and usually result in homonyms, whereas in term formation the semantic change is almost immediate (Даниленко 1977: 97–103). Words are usually terminologized by means of extension of the lexical meaning, e.g. *корень* 'root' ('a root of a plant' → 'root in mathematics'), or metaphorization, e.g. *кошка* 'a cat' ('an animal' → 'grappling iron').

Another means of term formation, which is characteristic of and highly productive in Russian, is syntactic. According to V. Danilenko the term 'syntactic means' refers to both compounding (thus producing one-word terms formed by means of compounding two stems into one word, either joined with a hyphen or spelled as one word, e.g. *нефтепровод* 'oil pipe line'), and composition (thus producing multi-word terms formed by means of joining several words into a word phrase, e.g. *ласточкин хвост* 'dovetail'). She also notes that the most productive models of forming multi-word terms are composing an adjective and a noun, a noun and a noun, three nouns, and a noun, an adjective and a noun (Даниленко 1977:103–107).

Lastly, the morphological means of term formation includes the same range of affixes which are used to create words of the standard language, and is one of the prevailing and most productive means of term formation, e.g. *краситель* 'colourant' (← *красить* 'to colour' + suffix *-тель*), *подотряд* 'suborder' (← prefix *под* + отряд 'order'). Nevertheless, there are quite a considerable variance between morphological means of term formation and word-building used in the standard language. Sources used for term formation are divided into two categories: internal (native) and external (borrowed). The latter, according to V. Danilenko, comprise only term-forming elements of international (Greek–Latin) origin, because borrowing

of ready-made words from the foreign languages to name special concepts is a distinct category of means of term formation. In the Russian language term-forming elements of Greek and Latin origin are very productive in formation of terminology of science (e.g. *биофизика* 'biophysics').

Scheme 4. Classification of the main ways and means of term formation in Russian (based on works of V. Danilenko)

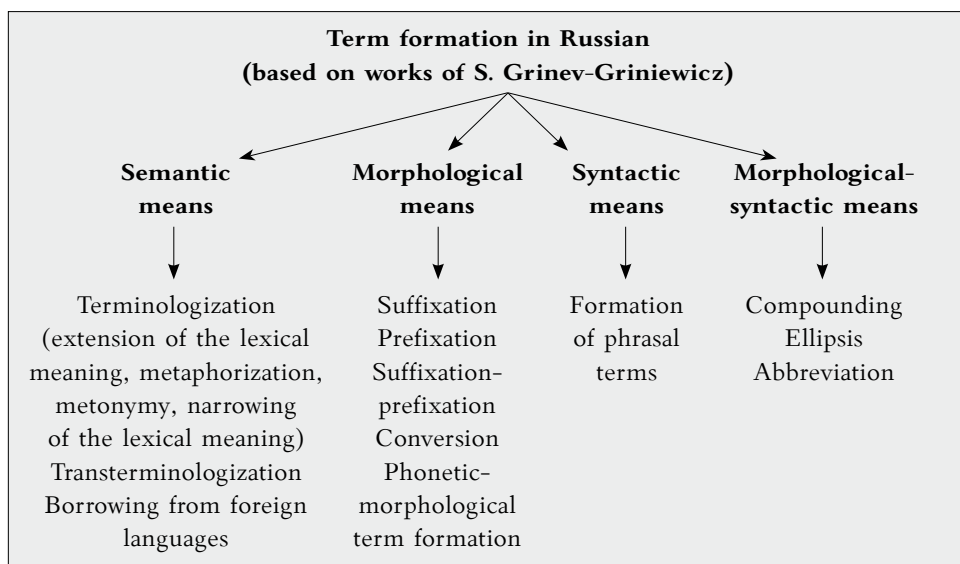| Term formation in Russian (based on works of V. Danilenko)		
Semantic means	**Morphological means**	**Syntactic means**
Terminologization (extension of the lexical meaning, metaphorization)	Affixation (on the basis of native and foreign term-forming elements)	Compounding (one word terms) Composition (multi-word terms)

The Russian terminologist Siergiej Grinev-Griniewicz suggests that terms can be classified on the basis of numerous criteria, such as form, history, chronological status, and content (Гринев-Гриневич 2008: 59–66). According to the structure, terms are usually classified into one-word (or mono-lexemic) terms and multi-word terms (word-combinations, poly-lexemic terms). S. Grinev-Griniewicz notes that in most European languages the number of multi-word terms ranges from 60 to 80%. One-word terms are also grouped according to their structure into simple (or root words), derivatives and compounds (Гринев-Гриневич 2008: 121–123).

Another parameter to take into account when classifying terms is the historical aspect. Thus terms are classified into native and borrowed. Terms of native origin can be further classified into simple in structure (root-words) and formations (based on morphological and morphological-syntactic word formation means) (Гринев-Гриневич 2008: 60–61). Borrowed terms, in turn, can be classified according to various criteria, such as the time period of the borrowing, the source language, sphere of use of the borrowing (Гринев-Гриневич 2008: 153). The author makes an observation that the issue of borrowing in terminology has been given little attention, because anything applicable to borrowings in general, can

be applicable to terminology as well, because the majority of borrowed words are terms.

S. Grinev-Griniewicz designed a generalized classification of types of term formation relying on ways and means of term formation described by the most prominent Russian and foreign scholars, which has been used for analysis of special lexis of various fields. Thus the following types of term formation processes are distinguished: semantic, morphological, syntactic and morphological–syntactic (Гринев-Гриневич 2008: 123–162). For the sake of convenience we have arranged them into a scheme (see Scheme 5).

Scheme 5. Classification of the main ways and means of term formation in Russian (based on works of S. Grinev-Griniewicz)

Term formation in Russian (based on works of S. Grinev-Griniewicz)

Semantic means	Morphological means	Syntactic means	Morphological-syntactic means
Terminologization (extension of the lexical meaning, metaphorization, metonymy, narrowing of the lexical meaning) Transterminologization Borrowing from foreign languages	Suffixation Prefixation Suffixation-prefixation Conversion Phonetic-morphological term formation	Formation of phrasal terms	Compounding Ellipsis Abbreviation

The authors of the two previously discussed classifications have a different position on the status of compounds. V. Danilenko does not distinguish morphological-syntactic means and attributes compounding to the syntactic means of term formation.

The classifications of V. Danilenko and S. Grinev-Griniewicz apparently have a different starting point than those presented by A. Superanskaja et al. and V. Leitchik. V. Danilenko and S. Grinev-Griniewicz base their classifications on the type of the means of term formation (semantic, morphological, syntactic). However, the etymological criterion is also applied to each of the types of term formation means described, e.g. the semantic means of term

formation relies on both internal (terminologization of native words, extension of the lexical meaning, metaphorization, metonymy, narrowing of the lexical meaning, and transterminologization) and external sources (borrowing from foreign languages); the morphological means of term formation relies on internal sources meanwhile the syntactic and morphological-syntactic means of formation can rely on both internal and external sources.

CLASSIFICATION OF WAYS AND MEANS OF TERM FORMATION IN SOME WORKS OF SAGER AND IN ISO 704:2009

This section presents analysis of the chosen works on the English terminology. We will overview some works of Juan C. Sager, a well-known terminologist, who was awarded Eugen Wüster Prize to recognize outstanding performance in the field of terminology by Infoterm in 2001, and the International Standard ISO 704 (Terminology work – Principles and Methods) of the International Organization of Standardization (ISO 704:2009 (E)). ISO 704 standard presents term-formation methods which apply to the English language. They may also apply to other languages, but not necessarily in the same way, because ways and means of term formation 'depend on the lexical, morphosyntactic, and phonological structures of individual languages'; therefore, 'language-specific principles of term formation should only be described in national and regional standards dealing with a particular language rather than in International Standards' (ISO 704:2009 (E): 38).

The classifications of ways and means of term formation used in English have a similar feature – they primarily rely on the distinction between the use of the existing forms, creation of new forms, and the use of new resources.

The terminologist J. C. Sager claims that the range of structures used to make terms in special languages is same as used to make words of the general language. The difference is that the specialised vocabulary 'exhibits far greater regularity as a result of the deliberate and often systematic techniques of term creation' (Sager 2004: 1924).

Ways and means of term formation are referred to as linguistic methods of designation in the works of J. C. Sager. They apply to terminology of various subject fields. J. C. Sager states that the classification of the methods of term formation he discusses 'is not intended to be exhaustive, but is rather indicative of the range of possibilities' (Sager 1990: 71–80; Sager 1997; Sager 2004: 1924–1928).

J. C. Sager distinguishes the following methods of term formation:
- the use of existing sources,
- the modification of existing sources,
- the use of new resources (creation of new linguistic entities) (see Scheme 6).

The use of existing resources implies extension of meaning of a word which is part of the general language. Extension of meaning is realized by means of a simile (naming a concept on analogy to another, e.g. *an L-shaped room*), a metaphor (naming a concept by the thing it most resembles, e.g. *goose-neck clamp*) or the use of a proper name (e.g. *watt*). However, J. C. Sager does not take into account the structure of a terminologized or transterminologized term: whether the word is simple in its structure or is a derivative. This is probably due to the fact that it is difficult to determine whether a derivative was created to denote a new concept or was transferred from general language or another special language (terminologized/transterminologized).

The modification of existing sources, as a way of term formation, includes affixation (or derivation), backformation, compounding, creating phrasal terms, conversion and compression.

J. C. Sager notes that affixation (suffixation and/or prefixation) plays an important role in contributing to the systematic structuring of terms, because of the precise expression and systematic reference of affixes. He also states that the range of affixes used to form terms in special languages is much wider than in general English, because a lot of words and word elements from classical languages, such as Greek and Latin, came into English, especially in the area of science and technology, e.g. *super-elevation ← super + elevation*; *compaction ← compact + ion*.

Similar to affixation, compounding is also very important for the systematicity of specialised vocabulary. A compound is a new syntagmatic unit, which is formed by means of combining two or more words and has a new meaning independent of the constituent parts and as a term represents a concept relevant to a particular subject field (Sager 1997: 34). In compounds which consist of two elements, the first element is usually the determinant, which modifies the second element, which is the nucleus of the compound, e.g. *water load*, *sight width*. Moreover, compounds can be also formed by a combination of three or four elements, or, sometimes, even five and six.

J. C. Sager also uses the terms *phrasal compounds*, which are phrases consisting of words linked by prepositions (Sager 2004: 1927), and *compounds of phrases*, which are phrases including prepositions, articles, conjunctions and adverbs (Sager 1990: 74), but the distinction of them is not that clear in his works.

As a separate category of means of term formation, J. C. Sager distinguishes formation of *phrasal terms* (e.g., *detection of cracks by dye penetrant method*). Their creation is closely related to compounding and, as J. C. Sager states, 'the preference for one or the other method is a matter of linguistic predispositions' (Sager 1997: 36). The Germanic languages have greater facilities to form compounds, whereas the Romance languages have to rely on formation of phrasal units. According to J. C. Sager, 'in English phrasal terms are created when a compound may not be sufficiently clear or even be ambiguous' (Sager 1997: 36).

Another means of term formation used to make terms by modifying the existing sources, is conversion. In this case a word changes its grammatical category without morphological alteration of the word. J. C. Sager notes that conversion is frequently used to form nouns on the basis of verbs and adjectives and vice versa; however, the direction of the derivational process is not always easy to establish (e.g. *design*, *supply*). Moreover, the productivity of this means of term formation in scientific English is reduced because a high proportion of terms include elements of Latin and Greek origin and are unsuitable for conversion (Sager 2004: 1927).

Special languages also have a lot of terms formed by various types of compression of existing long terms. The most productive and frequent means of compression are acronymy (e.g. *FM, DDT*) and clipping (e.g., *maths*, *lab*) (Sager 1990: 37, 38).

One more means of term formation, based on the modification of existing sources, is backformation. J. C. Sager claims that backformation is more productive in the domain of technology rather than science and results in complex verbs which refer to nominal concepts of processes and often goes along with compounding (Sager 2004: 1927).
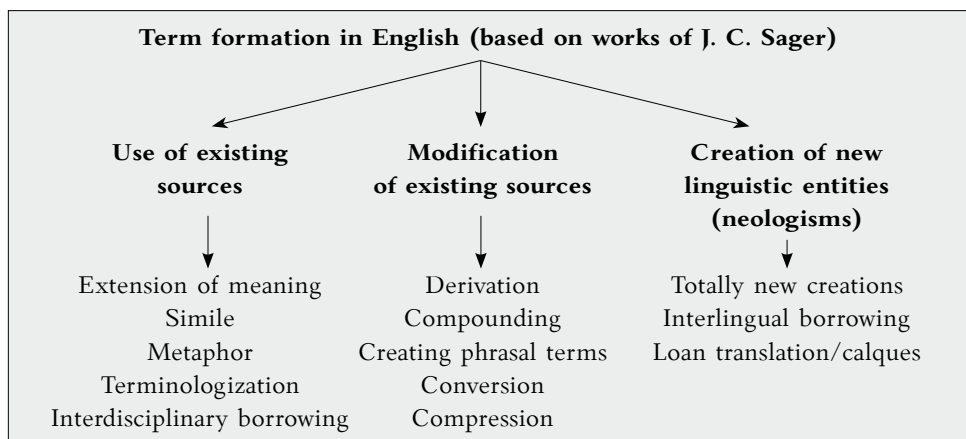
The last method of term formation, as discussed by J. C. Sager, is the use of new resources or creation of new lexical entities (neologisms). They can be of two types: creation of totally new entities and borrowing from other languages (direct borrowing and loan translation). In the domain of science and technology this process stems from the need to name unique new concepts. In special languages it is rather unusual to create totally

new entities, because new terms have to reflect the relationships of new concepts with the existing ones, that is the process of creation of new terms has to be systematic, which can be easily achieved by means of affixation and compounding. At this point J. C. Sager notes that in English it is often problematic to make a distinction between the creation of genuine neologisms by means of derivation using Latin or Greek word elements and borrowing of terms as ready-made words from Latin, Greek and French. Moreover, it is not always possible to determine the source of borrowings, because English has had "such a long tradition of borrowing from all three languages that it is very often impossible to say whether a word has come into English via French or whether it has been taken directly from one of the classical languages" (Sager 1990: 38).

In contrast, in modern English borrowing from other languages is quite rare. It is usually modern English which becomes the source of borrowing of new terminology into other languages. Alongside direct borrowing, J. C. Sager discusses loan translation, or calque, which is the result of literal translation, word-for-word substitution of the lexical components of compounds. J. C. Sager claims that 'loan translation is preferred to direct borrowing, but neither form of term creation is acceptable if it violates the natural word formation techniques of a linguistic community' (Sager 1990: 87). This means that both direct borrowings and loan translations have to conform to the requirements of the target language.

The Scheme 6 summarizes the ways and means of term formation described by J. C. Sager in his works in 1990, 1997 and 2004:

Scheme 6. Classification of the main ways and means of term formation in English (based on works of J. C. Sager)

Term formation in English (based on works of J. C. Sager)		
Use of existing sources	**Modification of existing sources**	**Creation of new linguistic entities (neologisms)**
Extension of meaning	Derivation	Totally new creations
Simile	Compounding	Interlingual borrowing
Metaphor	Creating phrasal terms	Loan translation/calques
Terminologization	Conversion	
Interdisciplinary borrowing	Compression	

Another universal classification of ways and means of term formation is presented in the International Standard ISO 704 (*Terminology work – Principles and methods*) of the International Organization of Standardization (ISO 704:2009 (E)). The main ways of term formation presented in ISO 704, which apply to the English language, are:

- creating new forms,
- using existing forms,
- translingual borrowing (see Scheme 7).

Creating new forms covers such means of term formation as derivation (adding one or more morphological elements, or affixes, to a root or a word), compounding (resulting in complex terms, phrases or blends) and abbreviated forms (short forms, clipped terms, abbreviations, initialisms, and acronyms).

Using existing forms includes such means of term formation as conversion (i.e. change in part-of-speech), terminologization (assigning new, frequently analogous or metaphoric meanings to existing terms in related fields or general language words), semantic transfer within a special language, and trans-disciplinary borrowing (metaphors).

Finally, translingual borrowing is of two types: direct loans and loan translations.

Scheme 7. Classification of the main ways and means of term formation in English (based on ISO 704:2009 (E))
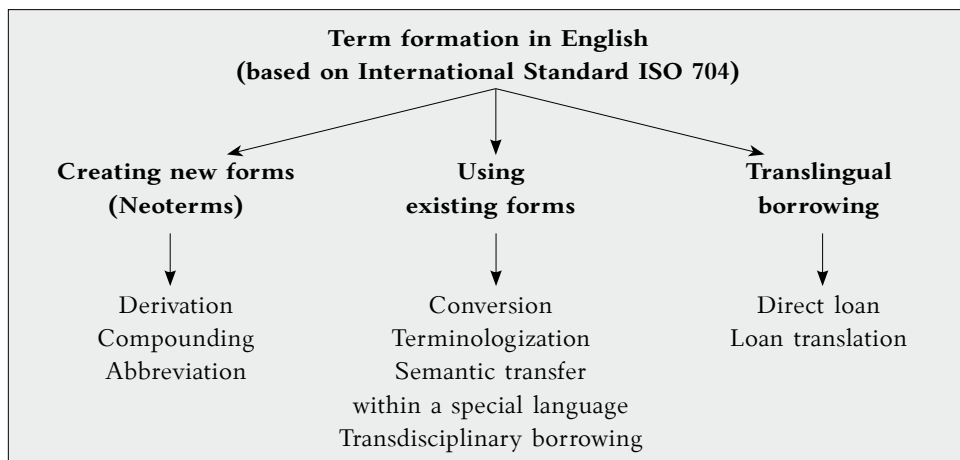
The comparison of the two classifications above shows that categorisation of the main ways and means of term formation in English is quite

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similar. The classifications rely on the following opposition: the use or modification of existing (internal) sources to create new terms is opposed to the use of external sources (translingual borrowing).

Still, the classifications have some differences. First, the status of such means of term formation as conversion is different. J. C. Sager attributes conversion to modification of existing sources, alongside affixation and compounding; meanwhile, in ISO 704:2009 (E) standard conversion is attributed to the use of existing forms, alongside terminologization and transterminologization. The different approach to the position of conversion in these classifications is quite congruous with the different conceptions of conversion in the theory of word-building. Conversion is viewed by some linguists as a subtype of derivation (Plag 2003: 17); other linguists discuss it as a separate category distinct from derivation and compounding (Jackson & Zé Amvela 2012: 100; Šeškauskienė 2013: 123).

One more difference lies in the interpretation of neologisms and their place in the classification. J. C. Sager treats borrowings from other languages as neologisms (Sager 1997: 38), meanwhile, the new definition of the term *neologism* by ISO/TC37 [1087–1:2009] states that only newly coined terms, either simple or complex, which appear in a language for the first time and have been created by means of linguistic mechanisms such as derivation, compounding or blending, can be considered neologisms (Valeontis, Mantzari 2006). Thus, borrowing from foreign languages should not be attributed to the means of creating neologisms. In this vein, the distinction between native and foreign sources used for term formation is crucial.

It should be noted that the above classifications of the Lithuanian, Russian and English ways and means of term formation are applicable to special languages in general, i.e. they present ways and means of term formation to be followed when forming terms in any domain of science and technology. Unequivocally, they may differ depending on the domain and the structure of a particular language.

CONCLUSIONS
The analysis of the descriptions and classifications of ways and means of term formation in the works on terminology in Lithuanian, Russian and English allows to draw the following conclusions:

1. In the works of the Lithuanian terminologists (St. Keinys, K. Gaivenis), the main criterion for classification of ways and means of term formation

is the opposition of internal and external sources: the use of existing vocabulary of standard language or dialects and creating new vocabulary using native word–building means (internal sources) as opposed to the use of borrowings (external sources).

2. The approaches of the Russian terminologists may be divided into two groups. One group (A. Superanskaja, N. Podolskaja, N. Vasiljeva, V. Leitchik) use the opposition of internal and external sources of terms as the main criterion for classification of ways and means of term formation. Another group (V. Danilenko, S. Grinev-Griniewicz) has a different starting point and base their classification on the type of means of term formation: semantic, morphological, syntactic and morphological–syntactic.

3. In the works on the English terminology (J. C. Sager, ISO 704:2009 (E)), several criteria are used in the classification of patterns of term formation: opposition of existing forms and borrowings as well as various means of term formation. However, they interpret differently the process of conversion and formation of neologisms and, therefore, the categories of term formation in their classifications do not coincide.

The results of the analysis reveal that the works on Lithuanian, Russian and English terminology provide similar approaches to the analysis of term formation, however, their starting points might be different: based on etymological criterion or the type of term formation process (morphological, syntactic, semantic). The choice of principles of term classification depends on the prevailing terminology traditions and the language structure. Classification of terminology of one language might be unsuitable or partially suitable for classification of terminology of another language. Therefore, contrastive analysis of term formation of several languages requires development of a specific classification which would cover all term formation ways and means in the languages under investigation and serve as a basis for their comparison.

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TERMINŲ KŪRIMO ANALIZĖ LIETUVIŲ, RUSŲ IR ANGLŲ TERMINOLOGIJOS DARBUOSE

Straipsnyje analizuojamos ir gretinamos žymiausių lietuvių terminologų St. Keinio ir K. Gaivenio, rusų terminologų A. Superanskajos, N. Podolskajos, N. Vasiljevos, V. Leitchiko, V. Danilenko ir S. Grinev-Griniewicziaus, terminologo J. C. Sagerio, tyrinėjusio anglų kalbos terminiją, bei Tarptautinės standartizacijos organizacijos pateiktos terminų kūrimo būdų klasifikacijos. Atlikta terminologų darbų analizė leidžia daryti tokias išvadas:

1. Lietuvių terminologų (St. Keinio ir K. Gaivenio) darbuose pagrindinis terminų kūrimo būdų klasifikavimo kriterijus yra opozicija tarp vidinių ir išorinių šaltinių: terminai skirstomi į daromus, panaudojant savąją leksiką (terminologizuojant gatavus žodžius bei kuriant naujadarus, pasitelkus savosios kalbos žodžių darybos inventorių), ir į pasiskolinamus iš kitų kalbų. Pagal formaliąją sandarą terminai skirstomi į vientisinius (vienažodžius) ir sudėtinius (keliažodžius).

2. Rusų terminologai A. Superanskaja, N. Podolskaja, N. Vasiljeva, V. Leitchikas vidinių ir išorinių šaltinių priešpriešą taip pat laiko pagrindiniu terminų kūrimo būdų

klasifikavimo kriterijumi. Tuo tarpu kiti rusų terminologai V. Danilenko, S. Grinev-Griniewiczius klasifikavimo pagrindu renkasi terminų darybos priemones, skirstydami jas į semantines, morfologines, sintaksines ir morfologines-sintaksines.

3. J. C. Sageris, kuris tyrinėjo anglų kalbos terminiją, bei tarptautinio standarto ISO 704 rengėjai, klasifikuodami terminų kūrimo būdus, sujungia keletą kriterijų: terminų šaltinius bei terminų darybos priemones. Tačiau jie skirtingai interpretuoja konversiją bei neologizmus, todėl terminų kūrimo modeliai jų klasifikacijose nesutampa.

Analizės rezultatai rodo, kad terminologijos darbuose, skirtuose lietuvių, rusų ir anglų terminijai, laikomasi panašių kriterijų, klasifikuojant terminų kūrimo būdus: remiamasi vidinių ir išorinių šaltinių priešprieša bei terminų darybos priemonių tipologija. Tačiau terminologai dažnai renkasi skirtingus klasifikavimo išeities taškus, akcentuodami arba terminų kilmę, arba jų darybą. Neretai jie skirtingai interpretuoja ir tuos pačius terminų darybos procesus. Terminų klasifikavimo principų pasirinkimą lemia tiek vyraujančios terminų kūrimo tradicijos, tiek kalbos, kurios terminai klasifikuojami, struktūra. Vienos kalbos terminų kūrimo būdų klasifikacija gali visai netikti arba tik iš dalies tikti kitos kalbos terminų kūrimo būdų klasifikacijai. Todėl, atliekant gretinamąją kelių kalbų terminų analizę, reikia sudaryti tiriamoms kalboms tinkamą klasifikavimo sistemą, kuri apimtų visus tiriamų kalbų terminų kūrimo būdus ir sudarytų pagrindą jų sugretinimui.

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