

Н.Н. Зяблова¹, В.А. Зяблов²

¹Национальный исследовательский

Томский политехнический университет

²Томский государственный университет

систем управления и радиоэлектроники

Terminology in the sphere of Information technologies in Russian and modern English: comparative aspect (grammar)

The present paper demonstrates the results of the research of English terms and terminological units and their Russian translation equivalents in the sphere of Information technology (IT). The comparative analysis of their grammatical structures has been carried out. Grammar ways of formation of terminological units of the specified subject area in Russian and English and have been identified.

Key words: terminological units; grammatical structure; comparison; information technology; Russian; English.

The current paper provides the results of comparative analysis of grammatical structure (parts of speech) of terms and terminological units in the topical and rapidly developing sphere of Information technologies (IT) in Russian and modern English. Most common and least common grammar structures of the specified terminological units in both languages have been identified to compare translation equivalents and find out most and least popular ways of designating special notions and objects of IT.

A lot of papers are published in scientific and technical journals in English and Russian and it is important to recognize ways of nominating objects in both languages and compare translation equivalents for making glossaries and successful professional communication.

Terminological units are widely used to designate special notions and objects in subject areas [2, 3, 4]. Terms and terminological units have been selected from scientific and technical papers according to traits of a term: absence of polysemy and synonymy, absence of emotional coloring, unambiguity within one scientific sphere, motivation (which is lexical and semantic transparency, i.e. quality of being easily seen through, disclosure of all relevant information) [2, pp. 48, 171], monosemy (or one meaning within one terminological sphere), consistency, persistence. One more important feature of a term is that it is a part of a controlled terminology.

Increase of new notions and objects in IT leads to coining new terminological units. Thus, research of terminology in IT sphere is required.

There have been found 185 terminological units from English scientific papers [1, 5, 6, 7, 8] relating to the sphere of IT. Terminological units have been translated into Russian with the help of an online dictionary Multitran or

Google translate to analyze and compare their grammar structures taking into account semantic relationships between the elements within one group. Sometimes the translation has been completed in accordance with the rules of translation of attribute groups followed by the search of the corresponding use via the Internet search line.

The comparative grammatical analysis of English and Russian terms and terminological units has revealed the following peculiarities in both languages: according to the number of components in a term or terminological unit: 7 terms have one component «*data*» – «*данные*», «*computer*» – «*компьютер*», 40 terminological units include two components in both languages «*platform technology*» – «*платформенные технологии*», «*smart design*» – «*умный дизайн*», «*information exchange*» – «*обмен информацией*», 42 terminological units are three component units in both languages: «*supply chain performance*» – «*эффективность цепочки поставок*», «*cloud energy storage*» – «*облачное хранилище энергии*», «*e-Paper products*» – «*электронная бумажная продукция*», «*deep neural network*» – «*глубокая нейронная сеть*», «*recurrent neural network*» – «*рекуррентная нейронная сеть*», «*artificial neural network*» – «*искусственная нейронная сеть*», «*transfer learning networks*» – «*сети трансферного обучения*», «*artificial intelligence (AI) techniques*» – «*методы искусственного интеллекта (ИИ)*», «*adaptive structuration theory*» – «*теория адаптивной структуризации*», «*technology affordance theory*» – «*теория доступности технологий*». Sometimes more or less elements in a terminological unit are used for translation into Russian: «*information technology alignment*» – «*выравнивание / унификация / элайнмент / айлайнмент ИТ*», «*central processing unit*» – «*центральный процессор*», «*graphic processing unit*» – «*графический процессор*», «*single-layer network*» – «*одноуровневая сеть*», «*advanced data mining*» – «*расширенный интеллектуальный анализ данных*». Due to widespread attribute groups that are formed without prepositions in English the number of elements in them is less than that in Russian terminological units as they include prepositions «*cloud energy storage*» – «*облачный сервис по хранению электроэнергии*». Thus, there is compression that minimizes the whole number of words necessary for transmission information. 30 terminological units combine with abbreviations: «*DES system*» – «*система обмена данными/система ввода данных/система DES*», «*smart BMS approach*» – «*умное решение (подход) сервера широкополосной рассылки сообщений*»/«*умный подход BMS*», «*IT-personnel*» – «*ИТ-персонал*», «*IT-specialists*» – «*ИТ-специалисты*», «*IT-related strategic thinking*»/«*IT-based strategic thinking*» – «*стратегическое мышление, связанное с ИТ*» (an adjective is separated with a comma in Russian), «*geo-distributed IoT devices*» – «*геораспределенные устройства*

Интернета вещей», 20 abbreviations: *ICT (Internet and communication technology)* – *ИКТ (Инструменты Интернета и коммуникационных технологий)*, *UTAUT (unified theory of acceptance and use of technology)* – *ТАУТ (единая теория принятия и использования технологий)* (a prepositional phrase in English is not a prepositional one in Russian), *IoT (Internet of Things)* – «сетевой контроль доступа физических объектов/технология интернета вещей / интернет физических объектов / технология контроля промышленного оборудования через интернет» (there are no abbreviated equivalents in Russian).

Terminological units containing more than three components are widespread in both languages and are the largest group: «*decentralized fog data centers for real-time information exchange*» – «децентрализованные центры обработки данных тумана для обмена информацией в режиме реального времени», «*centralized cloud data centers*» – «централизованные облачные центры обработки данных», «*intelligent scheduling of EVs plugin*» – «плагин интеллектуального планирования электромобилей», «*IoT cyber-physical network technology*» – «киберфизическая сетевая технология IoT». The longest terminological unit comprises 10 components: «*smart scheduling of charging and discharging of energy storage systems*» – «разумное планирование состояния зарядки и разрядки энергоаккумулирующей системы». The more complicated the structure of terminological units is the less they are used.

Participle I and II are translated with adjectives: «*specialized electronic commerce website*» – «специализированный сайт электронной коммерции», «*high-functioning analysis system*» – «высокофункциональная система анализа».

Hyphenation is frequent in English: 37 terminological units with hyphenation in English are used without hyphens in Russian «*holistic human-organization-technology (HOT)*» – «комплексная технология общественной организации», «*machine-to-machine communication*» – «межмашинная связь», «*technology-organization-environment (TOE) framework*» – «структура организационной среды технологий», «*web-based services*» – «сервис, работающий через интернет»/«веб-сервисы» (a transliterated variant), the following terminological unit consisting of three elements is translated into Russian with one word without a preposition and a hyphen «*goodness-of-fit (GOF)*» – «пригодность». So, compression in English expressed with hyphens can be reached with one word in Russian. In «*single-layer network*» – «одноуровневая сеть» three words are changed into one in Russian. Thus, there is a tendency to compression in Russian. When translating terminological units with an abbreviation «*IT*» into Russian hyphen is added: «*IT department employees*» – «сотрудники ИТ-отдела», «*IT division*» – «ИТ-подразделение».

Terminological units with numerals and special words or abbreviated forms of words are not widely used in Russian and English: «*five-stage innovation-decision process model*» – «пятиэтапная модель процесса инновационных решений», «*vehicle-to-home (V2H) technologies*» – «система обмена информацией между транспортным средством и домом», «*vehicle-to-grid (V2G)*» – «система обмена информацией между транспортным средством и электросетью», «*business to business to customer*» *business model (B2B2C)* – «бизнес-модель «бизнес-бизнес-клиент»», «*dedicated business-to-business (B2B) network platform*» – «специализированная сетевая платформа для бизнеса (B2B)», «*smart buildings with vehicle-to-grid (V2G) and vehicle-to-home (V2H) technologies*» – «умные здания с технологиями «автомобиль-сеть» (V2G) и «автомобиль-дом» (V2H). As can be seen from Russian examples there is not a tendency in Russian to apply colloquial language for nominating special objects and notions in scientific sphere (e.g. when a preposition «to» becomes «2»).

In conclusion, the following grammatical combinations have been found in English: components of attribute groups (=terminological units) which are joined without prepositions and are placed in pre-position to a noun being described at the end of the group can be expressed by nouns, adjectives, present participles and past participles. This creates economy of lexical units necessary to nominate a special object due to compression. Compression is also achieved by numerals, hyphenation and abbreviation. That is why English is thought to be implicit. Russian is explicit and more lexical units are necessary to nominate the same objects.

Abbreviations and combinations with them are frequently as a means of compression with or without special words in English, while in Russian they are rare. Prepositions are used as part of terminological units which can also be compressed as abbreviations in English, while in Russian there is no such linguistic phenomenon. Hyphenation is widely used for connecting components in English, but it is not widespread in Russian. Nouns from the sample used as single elements are rarely used in both languages. Numerical part in terminological units is not typical for both English and Russian.

Thus, most common grammatical ways of designating special notions and objects in the sphere of IT in English and Russian have been identified: they are adjectival and nominal. Adjectives and nouns are used as attributes to nouns in attributive groups in English, while adjectives and nouns with prepositions or nouns joined with the help of case endings are widely used in Russian terminological units.

The findings of this paper may have practical application for specialists in IT sphere and translators from Russian into English and vice versa.

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