

TURKISH STUDIES IN TECHNICAL TRANSLATION

**Editor-in-chief
Mine YAZICI**

**Co-editor
Edip Serdar GÜNER**



AKADEMİSYEN
KİTABEVİ



AKADEMİSYEN
KITABEVİ

© Copyright 2018

Bu kitabın, basım, yayın ve satış hakları Akademisyen Kitabevi A.Ş.'ne aittir. Anılan kuruluşun izni alınmadan kitabın tümü ya da bölümleri mekanik, elektronik, fotokopi, manyetik kağıt ve/veya başka yöntemlerle çoğaltılamaz, basılamaz, dağıtılamaz. Tablo, şekil ve grafikler izin alınmadan, ticari amaçlı kullanılamaz. Bu kitap T.C. Kültür Bakanlığı bandrolü ile satılmaktadır.

ISBN **Yayın Koordinatörü**
978-605-258- Yasin DİLMEN

Kitap Adı **Sayfa ve Kapak Tasarımı**
Turkish Studies In Technical Akademisyen Dizgi Ünitesi
Translation

Editor-in-chief **Yayıncı Sertifika No:**
Mine YAZICI 25465

Co-editor **Baskı ve Cilt**
Edip Serdar GÜNER **Sonçağ Matbaacılık**
ANKARA/2018

GENEL DAĞITIM
Akademisyen Kitabevi A.Ş.

Halk Sokak 5 / A
Yenişehir / Ankara
Tel: 0312 431 16 33
siparis@akademisyen.com

www.akademisyen.com

CONTENTS

FOREWORD	v
-----------------------	---

Prof. Dr. Alev BULUT

EDITOR'S NOTE	ix
----------------------------	----

Prof. Dr. Mine YAZICI

TURKISH STUDIES IN TECHNICAL TRANSLATION	xi
---	----

CHAPTER I

Introducing Information Technologies in

Technical Translation	1
------------------------------------	---

Asst. Prof. Dr. İnönü KORKMAZ

Introductory Remarks.....	1
---------------------------	---

Information Technologies: Past and Present.....	3
---	---

Machine Translation.....	7
--------------------------	---

Computer Aided Translation.....	20
---------------------------------	----

Concluding Remarks.....	32
-------------------------	----

References.....	34
-----------------	----

CHAPTER II

Terminology Formation in Turkish	37
---	----

Prof. Dr. Mine YAZICI

A Brief Historical Account of The Origins of

Terminology Formation	41
------------------------------------	----

Defining Features of Terms.....	43
---------------------------------	----

Word-formation vs Terminology Formation.....	47
--	----

Terminology Formation in Turkish.....	50
---------------------------------------	----

Conclusion.....	59
-----------------	----

References.....	60
-----------------	----

CHAPTER II

Terminology Formation in Turkish

Prof. Dr. Mine YAZICI

In the age of information technologies, communication is getting more complex despite the efforts of internalization and standardization in terminology formation. Because of globalization trends all over the world as well as the demand for rapid dissemination of new knowledge and technology, millions of new terms enter the terminological pool. Even professionals of close languages may suffer from miscommunication in face of chaos experienced in the field of terminology formation. As for the distant languages, terminological errors, or misunderstandings may even end in hazards or disasters affecting the lives of humans. For example, mistranslations of manuals may even end in plane or helicopter crashes as in the example of 2008 helicopter crash in France (Wooten 2011). In spite of the barriers in transferring terms in technical field, we import millions of terms every day and develop strategies to avoid mistranslations. On the other hand, terminologists and specialists strive for unity in terminology formation. As for Turkish, terminological chaos mainly results from the following reasons in Turkish:

1. The influx of millions of gadgets and new terms through Internet or publications every second all over the world; However, Turkish as well as other languages may lack their equivalents since there is no concept to form a new term.
2. Cultural, religious and spatial distances may pose barriers in terminology formation. For example, in countries where sexual issues are considered as a taboo, the foreign acronyms of sexually transmitted infections are used as in the example of AIDS.
3. Orthographic or phonological shifts due to the high number of loan terms from different languages may pose problems in transferring terms. Namely, the same term may be pronounced according to the phonetics of different languages. For example, the Greek term “keramos” was transferred into Turkish from the French term “seramique”. Accordingly, it is translated into Turkish according to the French phonology as “seramik”. However, some of the archeologists pronounced it according to the Greek terminology and use the term “keramik” in place of “seramik”, which causes terminological dilemma amongst the specialists and professionals (Hacızade 2014: 39-47).
4. The loan terms are naturalized in consideration of the phonology of the language they are first borrowed from. From the 18th century up till the beginnings of the 20th century, French was the Lingua Franca. Accordingly, the phonology of French was adapted in naturalizing the terms. However, in the course of time, English has become the Lingua Franca of the world. Subsequently, English phonology has been replaced with French phonology, which led to the orthographical and phonological shifts in Turkish from the direction of French to English. For example, the French term *ambolie* was

- first spelt and pronounced as *amboli* in Turkish, but later with the impact of English phonology, it has been pronounced as *emboli* in Turkish. Similarly, the French term *enzyme* was first pronounced as *anzim* as a loan word from French: However it is later pronounced as *enzim* although the pronunciation of the prefix “en” in the word “encyclopedia” remains same as “*ansiklopedi*” (Ertem 1998: 23; Yazıcı 2006: 73-81).
5. The usage of high number of synonyms or the usage of archaic and new terms at the same time. For example, *transparansaydam-şeffaf* in Turkish, or *myopic-nearsighted-shortsighted* in English.
 6. Register mismatches may also occur due to the mismatches between the prefixes and roots of the terms. While prefixes are directly transferred, the root is translated. For example, transfer of *millisecond* as *milisaniye*, or *microwave* as *mikrodalga* in Turkish. This is also true for compound terms where a word from general language is compounded with a term from specific language, as in the examples of *incir* (figs) *dermatiti* in Turkish or *meadow dermatitis* in English.
 7. High number of new coinages in the form of neologisms, or neonyms. For example, *Kuş gribi* (bird’s flu) as equivalent of Avian disease (Avian İnfluanza Hastalığı), or Mad cow disease (Deli dana hastalığı) as Turkish equivalent of *Bovin Süngerimsi Ensefalopati* (Bovine spongiform encephalopathy).
 8. The discrepancy between professional and layman language as in the example of Tetanus (Lockjaw) or in Turkish *Tetanoz* (Kazıklı humma= lit.staked fever) may cause misunderstandings.
 9. Discrepancies in spelling or punctuation especially in neonyms (new coinages in the form of compound terms). They

are sometimes hyphenated, sometimes separated, and sometimes compounded. For example, while the term *supraventricular* is written combined as *ventrikülüstü*, the term *intraventricular* is written separately as *ventrikül içi*. Or there may be differences in terms of spelling or punctuation in the examples of *asid-asit*, *bağırsak* or *barsak*.

10. Differences or discrepancies arising from the punctuation or spelling checks of softwares of computers. In Turkish, the compound terms are generally separated or hyphenated on the computer although the terminologist would rather use the terms in compounded forms. For example, *mikrodalga* is written separately as *mikro dalga*, which implicates revision of spellchecks of computers (Ertem 1998 :21-28).
11. Finally, direct transfer of eponyms and acronyms may pose barriers. For example, Creutzfeldt-JakobDisease cannot be naturalized according to Turkish phonology. Similarly, acronyms of some international organizations may be used in both ways. For example, the acronym of World Health Organization (WHO) is used whether as *Dünya Sağlık Örgütü* (WHO) or *Dünya Sağlık Örgütü* (DSÖ). On the other hand, some acronyms may not have Turkish equivalents as in the example of WWF (World Wildlife Fund).

The above-mentioned factors disrupt the unity in terminology formation. On the other hand, Nadiye Sarıtosun states that «Civilization is universal, culture is national; concepts are universal, words are national» (1994: 2). Accordingly, every field of study should hold responsibility for creating its own terms corresponding to the concepts imported through translation. At this point, the terminologists, professionals and translators should cooperate with each other to overcome the cultural and linguistic bar-

riers. Translator's role in this cooperation is central since translations primarily serve for the end of transferring new scientific knowledge and terms in the direction of developed countries to the developing or underdeveloped countries. On the other hand, terminology formation is closely related with scientific language. For example, when Peter Newmark classifies scientific language into three groups as academic, professional and layman language, he considers terminological density (Newmark 1988: 152). As for Turkish, it could not develop its scientific language up till the Reformation Period (1839 -1876). In other terms, Turkish was not accepted not only as official language, but also as scientific language nearly for 500 years until the decline of the Ottoman Empire in the 19th century. Accordingly, Arabic was adopted by the Ottoman intellectuals, which ended in the acknowledgement of Arabic as the medium of education in the Madrasas. In other terms, the religious, scientific and cultural supremacy of the Arabs led the Ottomans to acknowledge the supremacy of Arab culture, which extended to accept the Arabic language both as official and scientific language. Within this framework, having a brief outlook on Ottoman science history may yield us clues why Turkish scientific language experienced chaos in terminology formation although it is a rich and dynamic language to generate new words and terms.

A Brief Historical Account of The Origins of Terminology Formation

Military and economic decline of the Ottoman Empire starting from the end of the 18th century up till the beginnings of the 20th century led the Ottoman intellectuals to import knowledge from the West following Arabic scientific conventions for approximately five hundred years. The reversion of the direction of scientific convention ended in terminological chaos since most

of the scientific terms were transferred from Arabic language and the medium of education was Arabic. The Arabic scientific terms were used approximately 600 hundred years in the Madrasas and adopted as established terms in Ottoman scientific language. However, Ottoman scientists who observed the gap in the field of technology especially after the scientific and industrial revolution in the West started to orientate towards Western languages, especially to French as *Lingua Franca* of the so-called era.

The main debates on terminology formation started with the Reformation Period in 1839 and lasted even after the foundation of Turkish Republic in 1923, up till the first half of the 20th century. The orientation to the West ended in huge number of loan words and new terminological coinages (neonyms) in Turkish scientific language since it was difficult to keep up-to-date with the technological advances recorded in the West since the Industrial Revolution in the mid-18th centuries. Accordingly, we can claim the issue of Turkish scientific language came up on agenda with the implication of Imperial Edicts of Reformation, which lasted from 1839 to 1876. For this reason, focusing on a certain period of Ottoman Science History may yield us clues why terminological chaos hindered the transfer of technological advances, and why foreign terms could not comply with the conditions of Turkish word formation in creating new terms. There were several factors that compelled Ottoman intellectuals to discuss the Ottoman scientific language and problematize the transfer of terms. They can be enlisted as follows:

- Newly founded imperial or civil colleges,
- State run or civil scientific academies,
- Publications such as textbooks, scientific journals and terminological works produced as an extension of intensive translation activity so as to keeping pace with the Western civilization (Kazancıgil 1999: 210-282).

All these factors were interwoven to each to structure the Turkish scientific language and terminology. For a long period of time in history, scientific terms were borrowed from Arabic, Greek, Latin, French, or English since official language was Ottoman Turkish in Arabic Script (an artificial language composed of Turkish, Arabic, and Persian). Accordingly, scientific language was peculiar only to Ottoman Intellectuals. It lasted until the period of Reformation (The Imperial Edict of Gulhane), the time when scientific language French became the medium of education alongside Arabic in the newly founded military, imperial and civil colleges. Meanwhile, the official language and medium of instruction was discussed in the preparation of the Second Constitutional Monarchy in 1876. After long fervent debates amongst the Ottoman intellectuals, the official language and the medium of instruction was accepted as Ottoman Turkish in spite of Sultan Abdulhamid II's will of Arabic. It was only after this political decision that Turkish language could develop its scientific language which would extend to the conversion of Arabic script to Latin script in 1928 after the foundation of The Turkish Republic. Acknowledgement of Latin script not only facilitated, but also laid the foundations of terminology formation on sound grounds. After this brief historical account, studying the general features of terms in the next section may help us to understand the logics of terminology formation in Turkish better.

Defining Features of Terms

Distinguishing terms from words may yield us clues why cooperation is indispensable amongst the lexicographers, the terminologists and translators. Webster Encyclopedic Unabridged Dictionary defines "term" as "a word or group of words serving as the specific name of something, especially in a specific field".

From this definition, one can easily deduce that “all terms are words, but only some words are terms”. It means “a term” is not a constituent of general language. However, some of them may become a constituent of general language as a result of widespread usage of technological device and dissemination of knowledge through information technologies. For example, some terms such as computer, vacuum cleaner, cell phone, television etc. have become popular as part of the general language as a result of technological devices which have entered our daily lives after the scientific and technological boom in the 1970ies. Accordingly, the terminologists, in consideration of the consumers to be informed about technological advances, have to adopt such strategies in terminology formation as to cross over any barrier between the daily language and technical language.

It is for the same reason why terminologists, and terminographers move from concepts. In other words, arbitrary and conventional features of language do not yield conceptual clues to the terminologists in deriving, or coining new terms. It is only after lexicographers and lexicologists have studied the relations in the language system and drawn up regularities to disclose causal links in the systematicity of languages that terminologists can reach the concept and suggest a new term corresponding to the concept. In short, collaboration of terminologists with lexicologists is indispensable in terminology formation. Otherwise, continuous transfer of loan terms ends in dirtying of language and in accepting the supremacy of languages and cultures of technologically advanced countries. Özcan Başkan, a Turkish linguist and academician, claims that purism in Turkish terminology enables readers to set up transparent correlation between the concept and the object, thereby easy to learn and remember (cited by Gök-tolga 2004: 104-106). However, we cannot expect all the terms become popular.

At this point distinguishing “term” from “word” alongside distinguishing terminographer’s task from lexicographer’s may clarify why word formation is different from terminology formation. According to Ferdinand de Saussure, language is a system of signs, the components of which are “signifier” and “signified”. While “signifier” stands for object, “signified” indicates “concept”. He identifies discerning features of words as “arbitrary” and “conventional”, which are interrelated with each other since conventional aspect of “word”, or “symbol” means the general agreement or consent of the society without any logic behind it. It is for this reason why signs are arbitrary, and why there is no causal linkage between “the signified” and “signifier”. As for the “term”, it refers to something it represents, and gains sense only if it is associated with what it represents. In other words, “terms” form a network of relationships to represent a field of study. The richness of scientific jargon or terminology of a discipline is an indicator of its position as “an autonomous and established discipline” amongst other disciplines. Accordingly, we can claim that a discipline develops and expands in direct proportion to the number of terms it produces parallel to the advances recorded in the field of scientific knowledge and technology. To put it another way, the terminology formation is directly related with domain-specific language and there is a direct correlation between “the concept” and “term”. Accordingly, terminology formation is not “arbitrary” since the terminologist moves from “concepts” and searches for causal links with other terms to decide on the equivalent term that corresponds to the new concept. Similarly, translators also set out from the concepts to find out the equivalent term in target language, which generally ends in direct transfer, or explanation of the term through footnotes, or through the translation procedure called “explicitation”. If they cannot find the equivalent term, it

remains as a loanword until terminologists, terminographers, or in some cases professionals as well as laymen create a new term signifying the concept in consideration for the causal links in the systematicity of relations between the terms with reference to the specific field of study. On the other hand, lexicographers and linguists move from the “words” to the “concepts” to prove the systematicity of languages.

However, it does not mean there is no interaction between terms and words when considered the increased tendency for standardization in face of globalization and internationalization as fixed by the international or national boards or organizations of terminology. For this purpose, international organizations such as European Committee for Standardization (CEN), International Organization for Standardization (ISO), national organizations such as German Institute for Standardization (DIN in Germany, The Turkish Language Association (TDK) as well as the national or international academic or scientific boards of disciplines try to collaborate with each other to provide standardization in terminology. The main problem arises from the ever-changing and rapidly evolving technology especially in distant languages, urging academic or scientific boards of terminology to produce such new terms which both represent the field of study and address to the receivers of general language. All the efforts on the path to standardization aim to disseminate the scientific knowledge as far as possible since technology even in underdeveloped countries has become part of daily life. Laura Sasu summarizes the conditions of standardization as follows;

1. Linguistically correct,
2. Precise,
3. Concise (Sasu 2009:173).

Undoubtedly the main conditions mentioned above are reasonable, but it is difficult to abide by all the rules set by the universal terminological organizations in practice due to linguistic and cultural diversities arising from spatiotemporal distances. On the other hand, Turkish terminologists observe the similar rules in forming terms as long as the structure of language allows due to linguistic differences as well as the differences in scientific conventions on academic writing. For example, İbrahim Şahin in his paper on toponyms summarizes the main principles of terminology formation as follows:

1. The terms should be as concise as possible.
2. If the term consists of two, or more than two words, they should be written together to form a compound word.
3. If the term is used prevalently, it should be chosen amongst the other options.
4. The harmony in terms of punctuation and linguistic correlation between the terms should be observed in terminology formation (Şahin 2013: 48).

As seen here, Turkish terminologists observe the universal rules set by the universal organizations. On the other hand, comparative analysis on Turkish word formation and terminology formation in the next section may prove the dynamicity and capacity of Turkish language to serve for the universal ends of knowledge as mentioned above.

Word-formation vs Terminology Formation

Even if words bear arbitrary and conventional properties, there is a logic operating behind them. We call it “secondary type of causality” since language as a system is composed of a network

of causal relations at secondary level. Accordingly, the logics of word formation depend on the notion of what we call “secondary causality” even if there is no primary causality between the object and the word. Compared to other languages, word formation is easier in Turkish as an agglutinative language by inserting certain suffixes, or prefixes to the root of the word. As an agglutinative language, suffixes function as formative components of Turkish language (Aksan 2006: 27-45). One can not only derive adjectives or nouns from verbs, but can also derive verbs from nouns or adjective. Here are the examples:

A. Nouns or adjectives deriving from verbs;

1. Suffixes such as “-ci-cu”, “-m”, indicating activity: öğren-ci (student); uyuşturucu (narcotics); öldürücü (lethal); gözlem (observation), söyle-m (discourse), anla-m (meaning), işle-m (process), etc.
2. Suffixes referring to occupation: say-man (bookkeeper, accountant), öğret-men (teacher).
3. Suffixes such as “-ük”, “-cı”, “-geç”, “-ken-gen”, or “-gan” “-gil, -giç”, “-aç”, “-in,-ın” converting verbs into nouns, or adjectives: öksür-ük (cough), akı-cı (fluid, liquid), ilet-ken (conductive), yüz-geç (fin), geçir-gen (permeable), say-aç (counter), ak-ın” (raid), “bil-gin” (scientist, scholar), or bil-giç (pedant).
4. Suffixes such as “-ı”, “-u, ü”, “-ti”, “-inti” “-gi” “-ki” “-ak” “-ıt”, “-ek”, converting verbs into nouns; kork-u (fear), başar-I (success); kaz-ı (excavation), belir-ti (sign), ak-ıntı (flow, current); ölç-ek (scale)etc.
5. Suffixes such as “-v,-ev”, “-tay”-ey,y” borrowed from Central Asian languages such as Mongol, Kazakh or Chaghatay languages. These suffixes convert verbs into nouns; kurul-tay (congress), söyl-ev (speech), gör-ev (task), “den-ey” (experiment) etc.

B. Verbs or nouns deriving from nouns (denominals), or adjectives can be enlisted as follows;

1. Verbs deriving from adjectives;” boş-boşalmak, boş-amak (empty-to empty-to divorce), yüksek-yükse-lmek (high, to rise).
2. Verbs or nouns deriving from indefinite adjectives; az, az-al-mak, or az-ın-lık (little, to lessen, minority)
3. Verbs deriving from demonstrative adjectives: öteki, öteki-leştirmek (the other, to marginalize)
4. Verbs deriving from nouns; kan-kanamak (blood- to bleed), göz-gözlemek (eye, to watch)
5. Verbs or nouns deriving from the names of gadgets or tools, or objects; kilit/kilit-lemek (Key(n)- to lock (v), ev, ev-len-mek (home-to marry); silah-silah-lanmak (weapon-to arm)
6. Verbs or nouns deriving from the prepositions of place; karşı—karşılaşmak (across or against-to meet, to encounter), ön-ön-lemek (front-to prevent); altı-denizaltı (under/sub-submarine), yakın-yakınlaştırmak (near/close- to near), öteki-ötekileştirmek (other-to other/othering) (Lewis 2000: 219-235).

C. Words from binomials as in the examples of *yorgun argın* (dog tired), *derme çatma* (jelly-built). They emphasize the state or position of people, objects or things by repeating the word in different but harmonious sounds, thereby indicating the degree of effect.

D. Onomatopoeic verbs or nouns deriving from the imitation of the sounds generally made by animals: hav-lama(k) (to bark); miyav-lama(k) (to miaow).

F. Single words or collocations deriving from compound adjectives or nouns. Sometimes compound nouns or adjectives function as prefixes as in the example of “öngörü” (foresight) or

“hoşgörü” (tolerance) “arayüz” (interface), “sıradışı” (extraordinary). However, inserting suffixes in Turkish is more common than inserting prefixes.

G. Neologisms are also a way of word-formation. They are formed either by coining new words such as “böceksavar (insecticides, or insect repellents), or “uydu” (satellite) or by adding new senses to established or old words, which ends in polysemy.

H. Metaphors or metonymies are also helpful in creating new terms. For example, “Ağaç dalı” (branch of tree) may also mean “bilim dalı” (a branch of a discipline). (Özdemir 1973: 31-51)

We can expand this categorization. However, one should always bear in mind that the linguistic rules mentioned above may not always be applied due to “arbitrary” and “conventional” features of language. Accordingly, the above-mentioned brief categorization of word formation in Turkish cannot be assumed as definite since language as a dynamic system generates secondary causal relations as it expands its borders.

Terminology Formation in Turkish

Terminology formation is related with word formation. They cannot be isolated from each other. More specifically, we can explain this relation setting up correlations with neology and phraseology. What distinguishes neology from phraseology is that phraseology studies the set of fixed expressions especially in the form of compounds while neology deals with the new coinages in general language. On the other hand, terminology is also related to the neology and phraseology since it focuses both on new coinages and the set of expressions in the form of compounds corresponding to the scientific concepts (Gries 2008: 3-20). The

main discerning feature between them is that neology and phraseology concern general language. However, phraseology is directly related with the specific fields of study. From the point of research methodology, those studying in the fields of neology and phraseology conduct product-oriented and process-oriented research retrospectively even if they study the synchronic relations in general language since their ultimate aim in research is to serve for theoretical studies based on the linguistic findings they obtained from the data. On the other hand, terminologists also conduct product-oriented and process-oriented research. However, their ultimate aim is not only to study the terms available in specific fields, but also to spot the causal links related with the specific fields so as to form a network of specialized terms. Moreover, terminologists may suggest new terms corresponding to the new concepts. From this point of view, they study not only retrospectively as the linguists studying in the fields of neology or phraseology do, but also prospectively since they are entitled to suggesting new terms in the light of the principles they set in terminology formation. It is for this reason that terminology is also defined as the doctrine of terms (Pavel 1993: 21-30). It also explains why the terminologists assume the mission of suggesting new terms to the specific fields as in the example of terminological dictionaries published by Turkish Language Association in the 1980s. From these remarks, we may enlist the stages terminologists undergo as follows:

1. First, the terminologists concentrate on the concepts and relate them to the network of terminology in the relevant field of study.
2. Next, they categorize and relate it to the other terms available in the discipline.
3. Then, they set up correlations with the word-formation.

The current trend in terminology-formation in Turkish is “purism” in order to exchange and disseminate knowledge in such a way as to incorporate terms into daily language. This approach in the field of terminology was especially adopted by the Turkish Language Association, which was founded by Mustafa Kemal Atatürk in July 12th 1932. It has been an official regulatory body to enrich Turkish language and save it from the impact of Arabic, Persian, French, and English since its foundation. In the foundation years, the lexicographers’ studies on glossaries helped to explore Turkish equivalents of loanwords, which contributed to word-formation in Turkish. By this way, the border between the colloquial language and scientific knowledge has been lifted. It helped Turkish language to flourish as an official and literary language. As for scientific language, it was peculiar to professionals and academicians since most of the terms were in Latin, Greek, Arabic, French or English until 1980s. It was only after 1980s or after the written culture, or rules of word formation were established that terminological campaigns of Turkification of foreign terms have been launched in several fields of study to promote knowledge sharing (Köksal 2018:17). However, this campaign of purism in scientific terminology was sometimes criticized by the scientists, or the professionals due to register mismatch in terms of lifting the border between the colloquial language and academic language. Sometimes the Turkish equivalent of the term has not been used or acknowledged either by the layman or by the professionals even if there was no logical discrepancy in terms of terminology formation. For example, when the term “tecimsel” (commercial/mercantile) was first proposed by the terminologists of Turkish Language Association, it was not adopted by the layman; instead, the established Arabic term as “ticari” was widely used. However, today it is widely used by the economists even if the layman still prefers to use the Arabic

equivalent “ticari”. In spite of all these contradictory cases in terms of the usage of terms, we can claim that the campaign of Turkification of terms has achieved its ends in the course of time especially when the Turkish scientists started to conduct and develop their own research methods based on the national data, or corpus instead of just satisfying with the import of knowledge through translation activity with the concerns about seizing not only the universal knowledge, but also the technological developments in the West. In other words, producing original knowledge triggered terminological studies in Turkish and caused a lot of feverish debates on terminology formation in modern Turkish.

On the other hand, knowledge is universal, and most of the terms are imported through translation in the beginning. For this reason, it is difficult to discern original terms from the translated ones. They are interrelated with each other. Namely, translation plays an important role on the path to terminology-formation since the term is first formed where the new knowledge is produced. Accordingly, the following steps are taken in terminology formation; First, terms as an import of new knowledge are borrowed from other languages; Then, they are transferred as loanwords, some of which remain as loanwords, and are accepted as such by the language users; meanwhile, some of them are translated through analogy (similes, metaphors or metonymies), or through new terminological coinages called “neonyms”. Amongst these procedures “neonyms” especially concern us in terms of terminology formation. They are different from “neologisms” since neologisms are related to lexical formations in general language. Teresa Cabre distinguishes neonyms from neologisms basically in terms of their reference to a specific field, their creation, their function as well as their position and correlation with other terms to form a system with each other (Cabre 1999: 200-206). In other terms, neonyms move from the concepts in specific language as

opposed to arbitrary and conventional formations of neologisms (new coinages) in general language. From this point of view, while neologisms fulfill “expressive” function, neonyms fulfill “descriptive” function so as to form a network of concepts concerning the specific field. Bearing descriptive feature requires being “mono-referential”, which means that “neonyms” refer only to themselves in a specific field in such a way as to avoid ambiguity, or misinterpretation in the scientific jargon of specific field since systematization of conceptual or theoretical framework of a specific field is based on the precise and clear relations between the terms. It is for this they are mostly composed of compounds to denote only one single concept as in the example of “uçaksavar” (anti-aircraft), which is both descriptive and mono-referential compared to the arbitrary and conventional features of the words in general language. Accordingly, the conditions of terminology formation can be enlisted as clarity, precision, coherency, and derivativeness, which are just opposed to the arbitrary and conventional features of daily or general language.

Term formation through translation in Turkish can be summarized as follows:

1. Preserving Greek and Latin terms: Greek and Latin words are transferred as loanwords. There are some Greek terms established in Turkish: Açelya: (Azalêa), Ahlat: (Ahlâdi, yaban armudu). Akasya: (Akakîa) (Açıklalın 2018). They are adopted to Turkish orthography (naturalization). These terms are usually used in anatomy and in highly academic scientific publications. Mostly Latin and Greek roots, prefixes, suffixes are inserted to form a compound term as in the examples of Lymph(oma) or (mikro)fon, or anem(i), amon(yum) (anti)kor. But in some cases, such combinations end in register mismatch since one component of the compound in Greek or Lat-

in as *mikro*, the other component may be from daily language as in the example of *dalga*, or *wave*.

2. The clash between the archaic terms and new terms of Turkish origin may be one of the factors causing chaos. For example, using *viicut* (body) in place of *beden*, *dahiliye* (internal medicine) instead of *iç hastalıkları*.
3. The controversy between the general language dictionaries and terminological dictionaries may arise from the different entries for the same term. For example, the equivalent of the term *volume* appeared as *hacim* in the 1988 print version of general dictionary of Turkish Language published by Turkish Language Association. On the other hand, the pure Turkish term *oylum* was suggested by the nomenclature board of the Turkish Society of Cardiology. However, today the term *oylum* in the sense of *volume* appears amongst subentries of *oylum* in the electronic version of Turkish dictionary (<http://www.tdk.gov.tr/>). This means nomenclature boards of specific fields established in 1970s played a pioneering role in Turkifying foreign or archaic words (Ertem 1998:15-24).
4. Preserving pronunciation of the prefix in the same way as in French terms naturalizing terms. For example, *Chylopericardium* in French is transferred according to French phonology as *Şilopericard* in Turkish.
5. First, naturalizing French terms into English orthography, next transferring them according to the English phonology as in the examples of French terms *implantation*, or *impulse*. They are first transferred from French and pronounced in Turkish according to French phonology as “*emplantasyon*”, “*empuls*”. Next, they are adapted to English phonology as pronounced in Turkish as “*implantasyon*”, or *impulse*”. (Yazıcı& Pekçoşkun 2016: 193-205);

6. Replacing foreign terms with their equivalents in colloquial language. For example, “diabetes” is replaced with its equivalent in colloquial language “şeker” (sugar), or Glaucoma is replaced with “Karasu” (lit=black water). In colloquial language, it means to be blinded by *blackwater disease* (Glaucoma), or idiomatically it means to see someone’s path for a long time. In fact, Glaucoma is watering of the front part of the eye. For this reason, it is called “Blackwater” disease.

On the other hand, translation procedures overlap with terminology formation in Turkish. In the light of these introductory remarks on translation procedures of terms, terminology formation procedures in Turkish can be enlisted as follows;

1. Derivation: Turkish is a deductive language. For example, a loan word “seyyare” (planet) is a loan word from Arabic. Turkish equivalent was derived from the verb “gez-mek” (travel) and changed into noun by inserting “gen”. Finally it became “gez-e-gen”. “Gez” is the root of word; “gez-e” is the stem of the word, the form to which suffix is inserted; “-gen” is the final suffix inserted to the stem “geze”, which is the last procedure to convert the stem into the term. As seen in this example, terminology formation is interrelated with the rules of word formation in Turkish. This way of the terminology formation aimed to provide access to the layman.
2. Compounding: Turkish is a suitable language to form a single term (neonyms) by compounding “noun+noun”. For example, yerçekimi (gravity), kulakkepeçesi (auricle); They may be in the form of “adjective+noun” (al+yuvar: red blood cell), or in the form of “verb+verb”. For example, gelgit (tide), biçerdöver (harvester). They may be in the form of “verb+noun” (atar+damar: artery), or noun+verb (ışık+ölçer: lightmeter, or ısı+ölçer: thermometer). The compounding ca-

capacity of Turkish serve to produce “neonyms” fulfilling not only expressive function in daily language, but also descriptive and monoreferential by introducing new concepts to the network of specific field terminology.

3. Analogy: it covers metaphors and metonymies.

- Metaphor: It is a figure of speech a word, or a phrase is assigned to an object or an action. For example, *Köprü* means “bridge”, but it refers to an object to replace missing teeth in dentistry. *Mouse* mainly refers to an animal, but it is used as a device for computers. Similarly, the parts of the ear are nominalized through the analogy of the names of tools as *çekiç* (malleus), *örs* (the anvil), and *üzengi* (stapes).
- Metonymy: It is an indirect way of naming an object, or concept moving from an attribute of it, or part of it. For example, “teker” means “wheel”, but it refers to “car” as metonymy. Or “Çankaya” (capital of Turkish Republic) refers to The Grand National Assembly.
- Similes: They are formed by adding suffixes or preposition *gibi*, *kadar* (as... as; like) to the term in Turkish. For example, *siyah-ımsı* (blackish), *sarım-tırak* (yellowish), *kuş gibi* (like a bird).

4. Homonyms: The spelling and the pronunciation of the term is the same, but it gains different meanings in different fields of study. For example, *kepçe* means *ladle* in general language, but it means *pinna* in medicine if used as a compound word in medicine. For example, *Kaval* means *pipe*, but it refers to *tibia* in anatomy. Or *Yüz* refers to face in general language, but it refers to number “a hundred” in mathematics.

5. Explicitation: It means creating such a term as to foreground its defining features. In this way usually, a compound term is formed.

6. Shortening/clipping: It means the shortening of the term. For example, “Otomobil” is shortened as “Oto”.
7. Translation of Toponyms: The terms can also be formed from the names of geographical sites, or places, mountains. For example, Topkapi Palace, Agri Mount.
8. Translation of Eponyms: It means terms are created from proper names, for example Behçet’s disease.
9. Translation of Acronyms: It means using the initials of a compound term. For example, “Genetiği Değiştirilmiş Organizmalar” (genetically modified organisms) is replaced with the acronym GDO in daily language (Aksan 2015:94-124).

As an agglutinative language, Turkish is a dynamic language to derive new terms from the roots or stems of the words. Besides, it is open to form “neonyms” from compounds. One can form precise and concise terms by adding affixes or by compounding to the roots of the words. The same linguistic rules operate in deriving terms. This contributes not only to move from concepts, but also to disclose regularity in systemizing terms within specific field of reference. For example, Emin Özdemir categorizes terms conceptually, or according to their functions. He states they fulfill together with the linguistic rules concerning affixes. Accordingly, they are categorized as follows:

1. Those referring to tools, or gadgets
2. Those referring to action or task
3. Those referring to genre or community
4. Those referring to thought, science and arts
5. Those referring to formation and development
6. Those referring to psychological or philosophical activity (1973: 30-91).

After this classification, he identifies suffixes enlisted in word formation corresponding to the type of concepts categorized above. That is to say, terminology formation in Turkish is a combination of concepts and affixes as listed in word formation section above. This proves the capacity of Turkish to generate new terms without any need to transfer loan terms from foreign languages.

Conclusion

The dynamics of Turkish language as an agglutinative and deductive language put an end to the fervent debates on terminology formation as well as criticisms or misconceptions in the past that modern Turkish is a colloquial language and is not appropriate for scientific language. The linguistic account of terminology formation in Turkish I have shared so far may prove why every language as a living organism is rich and dynamic enough to generate its own scientific language and terminology as long as it abides by the theoretical framework of the field of terminology as well as the standards set by the universal organizations of terminology. However, the formation of new terms needs time and certain procedures to find their equivalents in all languages. That is to say, the terms undergo certain stages until they find their equivalents in languages.

Accordingly, terminology formation cannot be restricted to direct transfer of terms imported from technologically developed countries. Each language has the capacity to form its own terminology. However, assimilation of new knowledge takes time; it is only after the new knowledge has been internalized that loan terms may be replaced with new terms. In a way, the foreign terms related with new knowledge pass through an incubation period to generate their equivalents in scientific jargon. For this reason,

we cannot expect dynamics of language can generate terms since they are based on causal links within the systematicity of terminology formation as opposed to words based on the arbitrary and conventional features of language. Therefore, a close cooperation between the specialists, professionals, terminologists, lexicographers, terminographers linguists, translators and experts of information technologies is indispensable in laying the foundations of terminology formation on more sound grounds.

References

1. Açıklın, Hakkı H. (2018). Türkçedeki Yunanca kelimeler. Retrieved from <http://www.ocieties.org/drhakkiaicikalinupto/makcoyturkyunl.htm>.
2. Aksan, Doğan (2006). Anlambilim: Anlambilim konuları ve Türkçenin Anlambilimi. Ankara: Engin Yayınevi.
3. Aksan, Doğan (2015). Her Yönüyle Dil: Ana Çizgileriyle Dilbilim. Ankara: Türk Dil Kurumu Yayınları.
4. Cabré, Teresa M. (1999). *Terminology: Theory, Methods and Applications*. Ed. by Juan C Sager, Trans. by Janet Ann DeCesaris. Amsterdam/Philadelphia: John Benjamins Publishing Company.
5. Elmacı, İrfan (2017) Osmanlı Türkiyesinde Bilim Akademisi Kurma Birişimleri ve Deney, *Osmanlı Bilimi Araştırmaları*, 18(2), 77 – 92.
6. Ertem Güngör (ed.) (1998). Kardiyoloji terimleri Sözlüğü. Türk Kardiyoloji Derneği Yayınları.
7. Göktolga, Oğuzhan (2004). Bilim Terimlerinin Türkçeleştirilmesi. *İzzet baysal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 1 (8), 103-111.
8. Ertem Güngör (1998). Kardiyoloji Terimler Sözlüğü İstanbul Türk Kardiyoloji Derneği.
9. Gries, Stephan Th. (2008). Phraseology and Linguistic Theory:A. Brief Survey. In S. Granger& F. Menuinier (Eds.), *Phraseology An Interdisciplinary Perspective* (3-26). Amsterdam&Philedelphia: John Benjamins Publishing Company.

10. Hacızade, Fikret (2014). Seramik Alanında kullanılan Terim ve Kavramlarda Türkçenin Durumu. *Türkiyat Araştırmaları Dergisi*, (35), 39-47.
11. İhsanoğlu, Ekmeleddin. (1998). Osmanlı İmparatorluğunda Bilim Teknoloji ve Sanayileşmede Modernleşme Gayretleri. *Osmanlı Bilimi Araştırmaları* II, 1-22. İstanbul: İstanbul Üniversitesi Edebiyat Fakültesi.
12. Karaman, Burcu İlkay. (2009, January). Terim Oluşturma Yöntemleri. *Türk Dili Araştırmaları Yıllığı - Belleten*, 57(2), 45 – 59.
13. Kazancıgil, Aykut. (1999). *Osmanlılarda Bilim ve Teknoloji*. Gazeteciler ve yazarlar Vakfı Yayınları.
14. Köksal, Aydın (2018). Bilim Dili Türkçe. Retrieved from <https://www.tubaterim.gov.tr>. 30.08.18.
15. Lewis, Geoffrey (2000). *Turkish Grammer*. Oxford University Press.
16. Özdemir, Emin (1973). *Terim Hazırlama Kılavuzu*. Ankara: TDK.
17. Sarıtosun, Nadiye (1994, 26-28 Mayıs). Türkiye Türkçesinde Bilim Dili ve Terim Sorunu. In *Proceedings of VIII. Dilbilim Kurultayı*. İstanbul Üniversitesi: İletişim Fakültesi. Retrieved from <http://mimoza.marmara.edu.tr/~avni/dersbelgeligi/dil/bilim.htm>
18. Sasu, Laura (2009). Terminology Dynamics-Conceptual Patterns of Term Formation. *Bulletin of the Transilvania University of Braşov*. Vol.2 (51), 171-174.
19. Pavel, Silvia (1993). Neology and Phraesology as Terminology in the making In: Helmi B. Sonneveld&Kurt L. Leoning (Eds.), *Terminology: Applications in Interdisciplinary Communication* (21-35). Amsterdam: John Benjamins.
20. Şahin, İbrahim (2013). Türkiye Yeradbiliminde Terim ve Tür Sınıflandırması. *Avrasya Terim Dergisi* 1(1), 46-58.
21. Zülfişkar, Hamza (1991) *Terim Sorunları ve Terim Yapma Yolları*. Ankara: Türk Dil Kurumu Yayınları.
22. Wooten, Adam (2011, April). International Business: ‘Airline pulp’ and bad translations that can crash a plane. Retrieved from <https://www.deseretnews.com/article/705370135/Airline-pulp-and-bad-translations-that-can-crash-a-plane.html>.

23. Yazıcı, Mine (2006). Medical Terminology and Medical Dictionaries. *International Journal of Translation Studies*.73-88.
24. Yazıcı, Mine & Pekçoşkun, Sevda (2016). A Tentative Study on The Translation of Neologisms”. In Eyup Sarıtas (Ed.). *Cultural and Humanities Research (193-205)*, Indiana: Trafford Publishing.