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SCIENTIFIC AND TECHNICAL TRANSLATION ON THE REVISITED MAPS OF TRANSLATION AND TRANSLATION STUDIES

> Historically, scientific knowledge has proven to be a mobile form of culture. Translation is what has rendered this knowledge mobile.
> *Scott L. Montgomery, 'Scientific translation'*

This paper looks into the core of scientific and technical translation, with regard to the nature of science and technology texts. The article revises the research opinions on the development of similar and different features of these translation types and highlights the importance of their differentiation, notwithstanding that it is generally convenient to group science and technology together. The research attempts to prove that though scientific translation and technical translation are closely connected domains, they are not identical and the terms 'scientific' and 'technical' are not interchangeable. Of particular research interest is the studying of scientific translation and technical translation as separate fields within the translation science. The article analyses the existing bibliography maps of translation and Translation Studies, to find out that scientific translation and technical translation have quite recently found their place as distinct fields on the map of translation. However, on the map of Translation Studies, these translation types are not yet present. The assumption for this investigation was that theories of scientific and technical translation, among others, are highly likely to be established within specialized translation and they need a comprehensive methodological research. There is much prospect for these theories to be developed, provided that major recent theoretical works in the field are systematised.

Keywords: *science, technology, scientific translation, technical translation, TSB map of translation, TSB map of Translation Studies, theory of scientific translation, theory of technical translation.*

Translation is a motive power of modern society. It promotes knowledge between different cultures. It is also crucial for science and technology progress. In our digital era, scientific and technical translation plays an important role ever. Outstanding scientific and technological advances of recent years owe much to translation as a medium for communicating scientific and technical knowledge. These advances have cardinally transformed human lives making them virtually unrecognizable from fifty, or even twenty, years ago (Byrne, 2012, p. 1). And it is very important for many people to realize that these inventions and advances to a great extent became possible due to translation in 'its capacity as a vehicle for disseminating scientific and technical knowledge' (Byrne, 2012, p. 1).

As S. Montgomery once wrote, translation of science is as old as science itself, being, due to its important role both in collecting and spreading knowledge, no less integral to scientific progress than teaching and research (Montgomery, 2010, p. 299). Translation is virtually as old as writing itself – almost as long as humans have been writing they have been translating.

When speaking about translation historically, the first thing that commonly comes to mind is translating sacred texts – the Bible or the Koran. Yet, the translation of scientific and technical texts has a history, and it is the same long as that of religious translation, or even longer. It is proved documentarily that nearly every important scientific and technological discovery in history goes along with translation – there is hardly any example of an invention that was not transmitted to another language and culture by means of translation (Byrne, 2012, p. 3). In the XV century, translation really thrived, with Johannes Gutenberg having developed the first moveable type printing system, which revolutionized printing and had a great impact on translation and the passing around of scientific and technical knowledge due to the subsequent burst in the number of books published in Europe (Byrne, 2012, p. 3).

However, only during the last 100 years or so translation really influenced science and technology, when scientists were making numerous new discoveries and writing about their results in their native languages. As other scholars wanted to grasp new knowledge, the demand for translations of scientific texts was extraordinary.

These translations inspired new research and even more discoveries. But for translations, science would be underdeveloped, with each language area being intellectually isolated and each language community having to discover the entire body of scientific and technical knowledge for itself (Byrne, 2012, p. 4).

Through the ages, different factors have influenced the way scientific and technical translation is viewed today. As J. Byrne (Byrne, 2012, p. 5) rightly notes, in modern globalized economy, scientific and technical translation is considered in many ways to be the cornerstone of international trade and the scientific endeavour which fuels it, thus accounting for about 90% of global translation output – nearly every product sold or service provided involves the participation of scientific and technical translators (Byrne, 2012, p. 5). In fact, scientific and technical translation plays such a significant role in the life of modern society that it became the subject of various laws and regulations, and many international scientific journals, even those publishing articles in various languages, require translations of abstracts.

Practical translation of scientific and technical texts considerably enriches the theory of translation providing it with extensive material for further development. And this interaction is mutually advantageous – Translation Studies equips the translator with efficient ways and methods of rendering the meaning of scientific and technical texts which have always been in high demand.

Longing to explain the various sides of translation and possibly to give grounds for translation as a distinct field of study, the translation theory has developed numerous theories, models and approaches. It is currently important to define which of them can be applied to the development of methodology for scientific and technical translation as fields that have been traditionally neglected by translation theorists. Although a lot of valuable work has been done in the study of LSP and text typologies, which help understand why and how texts are produced in specific communicative contexts, there is still a lot to be done to comfortably apply a theoretical model to scientific and technical translation (Byrne, 2012, p. 8). These and other important issues are discussed in J. Byrne's seminal work 'Scientific and Technical Translation Explained. A Nuts and Bolts Guide for Beginners' (Byrne, 2012, p. 1), where the author provides a

broad and holistic introduction to scientific and technical translation so as to give a better understanding of this complex interdisciplinary area.

The importance of research into scientific and technical translation, distinguished from other translation types, was formulated by F. Aixela (Aixela, 2004), who argues against the view that scientific and technical texts can be easily translated when compared to literary texts. The extremely high requirements set for scientific and technical translation mark it out clearly from other genres making it into an independent research field in its own right. The scholar then considers that the present-day considerable growth in academic study of language for specific purposes has brought about a new awareness of the complexity and structure of this type of texts and their translation. This once again proves the fact that scientific and technical translation deserve much more attention, as 'it will be the main professional outlet for most of those enrolled in translation degrees and diplomas in universities. Thus, it would make sense to explore the state of the art, to discover how things have fared and how they still do in the minds of the researchers' (Aixela, 2004).

As viewed by another outstanding researcher in scientific and technical translation M. Olohan (2015, p. 6), science and technology are often paired together in general language usage, especially in terms of translation, though they indicate different, but related knowledge areas. Here the author compares the dictionary definitions of science and technology interpreted as 'the intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment' and 'the application of scientific knowledge for practical purposes', respectively (Olohan, 2015, p. 6). M .Olohan further comments that reflecting the close link between the two areas, these interpretations apparently suggest that technology appears from science and gives priority to the ends rather than the means ('application ... for practical purposes'). On the contrary, science seems to focus on the means by which knowledge is obtained, that is, through the scientific method of 'observation and experiment' (Olohan, 2015, p. 6).

In her following notes, M. Olahan adopts the convenience of grouping science and technology together, though admitting that the nature of the areas and the dynamic relationships between them can

be interpreted differently (Olohan, 2015, p. 7). The author suggests that science and technology share some features, challenges or approaches. Rather than dividing what is scientific and what is technical, M. Olahan focuses on 'the ways in which texts and language are used to perform specific communicative functions in technical and scientific contexts', referring here to the analytical concept of genre which the author considers helpful (Olohan, 2015, p. 7).

M. Olahan's ideas are supported by the prominent researcher in specialized translation F. Scarpa (Scarpa, 2020, p. 5), whose idea is that, while complementing each other, science and technology denominate different, if related, knowledge areas – 'science produces ideas whereas technology results in the production of usable objects' (Scarpa, 2020, p. 5). The author then adds that science is aimed at investigating the objective truths about the world through a systematic process called the scientific method, which is the foundation of modern scientific investigation, while technology is the practical application of science to create products that can solve problems and do tasks (Scarpa, 2020, p. 5). An important remark on contrasting the scientific and technical linguistics was expressed by P. Newmark who stated that the language of science is 'concept-oriented unlike the language of technology that is object-oriented' (Newmark, 1988, p. 155).

Here arises another point of discussion: proceeding from an understanding of scientific and technical translation as the translation of texts from the domains of science and technology, to what extent it is relevant to group them together (Olohan, 2008, p. 246). Thus, F. Scarpa specifies that, notwithstanding the differences and the necessity of distinguishing between scientific translation and technical translation, there are communicative features *common* for scientific and technical texts, that result in more convergences than divergences if the text-type conventions are considered (Scarpa, 2020, p. 5). The author adds that between scientific and technical texts there are very similar translation challenges and approaches, which refers them to the one category – specialised translation (Scarpa, 2020, p. 5). J. Byrne claims that these areas are grouped together partly for convenience of teaching these subjects in translator training institutions. Another explanation is that the boundaries of

scientific and technical texts are becoming more and more indistinct – texts are likely to combine elements of both scientific and technical texts. J. Byrne emphasises that though these two areas are separate in many aspects, the ways in which they appear in the real world suggest the idea that they need to be examined together (Byrne, 2012, p. 3).

In this respect, I. Pinchuck singles out three main categories of information, which supply the materials for scientific and technical translation: 1) the results of pure science, 2) the results of applied scientific research aimed at solving a certain problem and 3) the work of technologists, which is expected to end in a product or process, which can be sold. The author very aptly indicates that scientific and technical translation significantly overlap – 'that the work of today's scientists, i.e. theoretical scientific information, is likely to become tomorrow's technology giving us various tangible products, devices, services and so on' (Byrne, 2012, p. 3). J. Byrne confirms that though scientific and technical texts may differ and may contain the information of different forms, they are eventually founded on mostly the same information. On the other hand, scientific and technical translation considerably differ in the way in which this information is presented and used – 'while a technical text is designed to *convey* information as clearly and effectively as possible, a scientific text will *discuss*, *analyse* and *synthesise* information with a view to *explaining* ideas, *proposing* new theories or *evaluating* methods' (Byrne, 2012, p. 2). The author then concludes that the different goals may cause the language used in each type of text vary significantly, thus differentiating the strategies required to translate them (Byrne, 2012, p. 2). And each type of the text needs profound research by translation theorists.

In his further distinction of scientific and technical translation, J. Byrne (Byrne, 2012) states that though they are closely related fields, these translation areas are not identical and the phrase *scientific and technical* is not 'a tautological reference to the same type of translation' (Byrne, 2012, p. 2). Scientific and technical texts cannot be grouped as they exhibit differences in 'subject matter, type of language [and] purpose' (Byrne, 2006, p. 8).

All these theoretical works differentiating modern scientific and technical translation largely originate from the discussion of the translation science as a distinct discipline within which partial translation theories, such as text-type related theories, should be given proper research interest. This discussion was started by James S. Holmes in his famous work 'The Name and Nature of Translation Studies' (Holmes, 1972/2004). Holmes developed the so-called 'map' of the Translation Studies – a comprehensive framework describing the areas of the translation science. This framework was later on presented schematically by the outstanding translation theorist Gideon Toury (Toury, 1995) and is referred to as a Holmes'/Toury map (see Fig. 1).

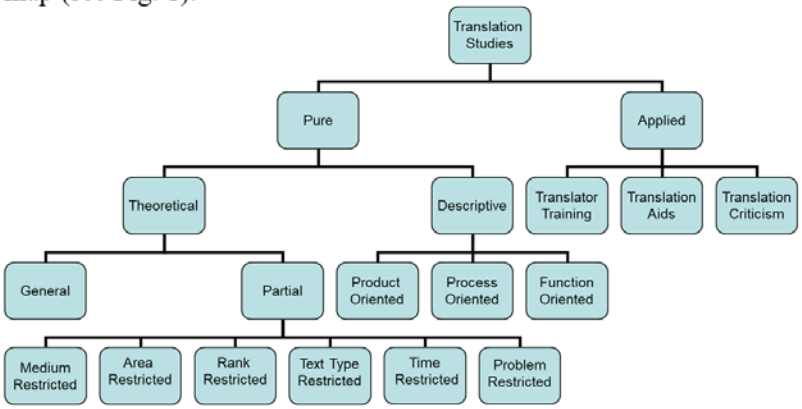

Fig. 1. Holmes's basic 'map' of Translation Studies

As analysed by J. Munday (Munday, 2016, p. 16), in Holmes's interpretation of this framework, the *pure* research areas include: (1) the description of the translation phenomena, and (2) the establishment of general principles to explain and predict such phenomena (translation theory). The *theoretical* branch is divided into general and partial theories. By *general*, Holmes means those writings that intend to describe or explain every type of translation and to draw generalizing conclusions that will be important for translation as a whole. The category of *partial* theories of translation is further divided into six sub-types: area-restricted, medium-restricted,

problem-restricted, rank-restricted, text-type restricted and time-restricted theories of translation.

In view of our discussion, it is interesting to note that Holmes wrote about text-type (or discourse-type) restricted theories of translation that deal with the problem of translating specific types or genres of lingual message (Holmes, 1972/2004, p. 180). The author stated that some effort had been made to develop a specific theory for the translation of scientific texts. However, Holmes believed that such a theory would not be successful because the discipline still 'lacked anything like a formal theory of message, text, or discourse types' (Holmes, 1972/2004, p. 180). Holmes's opinion was that 'writing on scientific and technical translation was overly focused on the word and word-group level, but he saw potential for new approaches based on the then emerging work in linguistics on defining text types, communication types and language varieties' (Olohan, 2008, p. 249).

Generally, as concluded by J. Munday (Munday, 2016, p. 20), Holmes's paper played a pivotal role in the delineation of the potential of Translation Studies. The map is still often employed as a point of departure, though present-day research has transformed the 1972 perspective. The surge in Translation Studies since Holmes has seen different areas of the map come to the fore (Munday, 2016, p. 22).

Thus, in our research, we can specify that Holmes's brief prediction of the importance of research into scientific and technical translation fuelled their development into separate types. They have been represented as independent thematic fields of translation on a new conceptual map of translation and Translation Studies designed by a prominent translation scholar of today Luc van Doorslaer in his paper 'Risking Conceptual Maps: Mapping as a Keywords-Related Tool Underlying the Online Translation Studies Bibliography' (Doorslaer, 2007). The researcher developed a new tool for the Translation Studies Bibliography (TSB), using keywords as an instrument for making a map of Translation Studies. L. van Doorslaer considers the Holmes/Toury map to be a 'monument in Translation Studies', stating that it is widely referred to in the scientific literature but it needs to be complemented – it is essential to draw completely new maps of the discipline. The author then presents his own conceptual map developed as an underlying tool for the online Translation Studies Bibliography (Doorslaer, 2007, p. 217).

In L. van Doorslaer's opinion, online research bibliographies – a more recent phenomenon – are regularly updated bibliographies that not only reflect the development of cultural and social phenomena within translation – they also express the development of the discipline of Translation Studies (Doorslaer, 2007, p. 219). The TSB project started drawing both thematic lists of keywords attributed to articles and a conceptual map based on the occurrence, frequency and interrelationships of keywords (Doorslaer, 2007, p. 222). The authors' initial idea was to develop the map of Translation Studies, however they gradually perceived that many of the keywords referred more directly to the act of translation than to the Translation Studies. And on the basis of the thematic keyword lists, it was decided to introduce this division on the basic map (see Fig. 2). L. van Doorslaer explains that 'while most full lines indicate a hierarchical relationship (or subdivision), it is already obvious that the most interesting and possibly also enigmatic line in this basic map is the dotted line between the two main areas. It indicates a 'special' relationship of a sort of complementariness, possibly internecessity, but no hierarchy, no inclusion etc.' (Doorslaer, 2007, p. 222). In this way, L. van Doorslaer's new maps distinguish between translation and translation studies, highlighting their different centres of research interest.

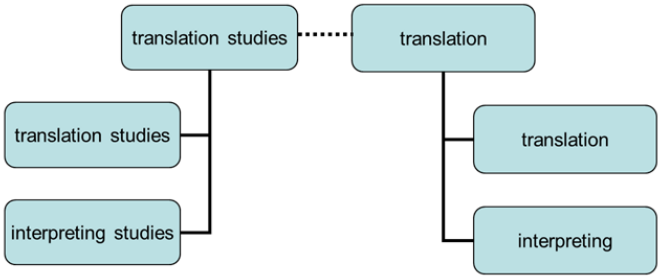

Fig. 2. Luc van Doorslaer's Basic Map 'Translation Studies – Translation'

Translation that focuses on the act of translating further distinguishes between the lingual mode, a typology based on the media used, the modes of translation and the thematic fields of translation (see Fig. 3) (Doorslaer, 2007, p. 223).

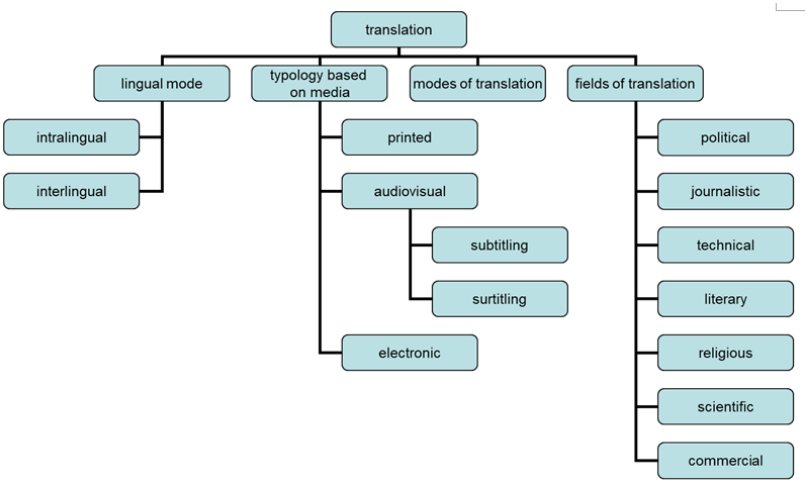

Fig. 3. Luc van Doorslaer's Map of Translation

Previously, scientific translation and technical translation did not function as separate translation fields – they were rather considered together in terms of specialized translation, which was not given proper research attention if compared to the translation of literary texts. As Figure 3 shows, scientific translation and technical translation are presented on the map as distinct fields, which proves the idea that they have formed into separate research areas, each having its own subject matter. Thus, the map justifies that the literary focus of much of earlier works on translation has shifted towards the non-literary part, paving the way to establishing other than literary independent subfields of political, journalistic, technical, religious, scientific and commercial translation. Overall, the map considerably facilitates categorising translation by field or genre.

The working hypothesis in our research is that since there have appeared on the map of translation (not yet on the map of Translation Studies) scientific translation and technical translation, among others, as thematic fields of translation, there are highly likely to be developed respective partial theories of scientific translation, technical translation, etc. And they can appear as genre theories on the L. van Doorslaer's map of Translation Studies (Doorslaer, 2007, p. 230) (see Fig. 4).

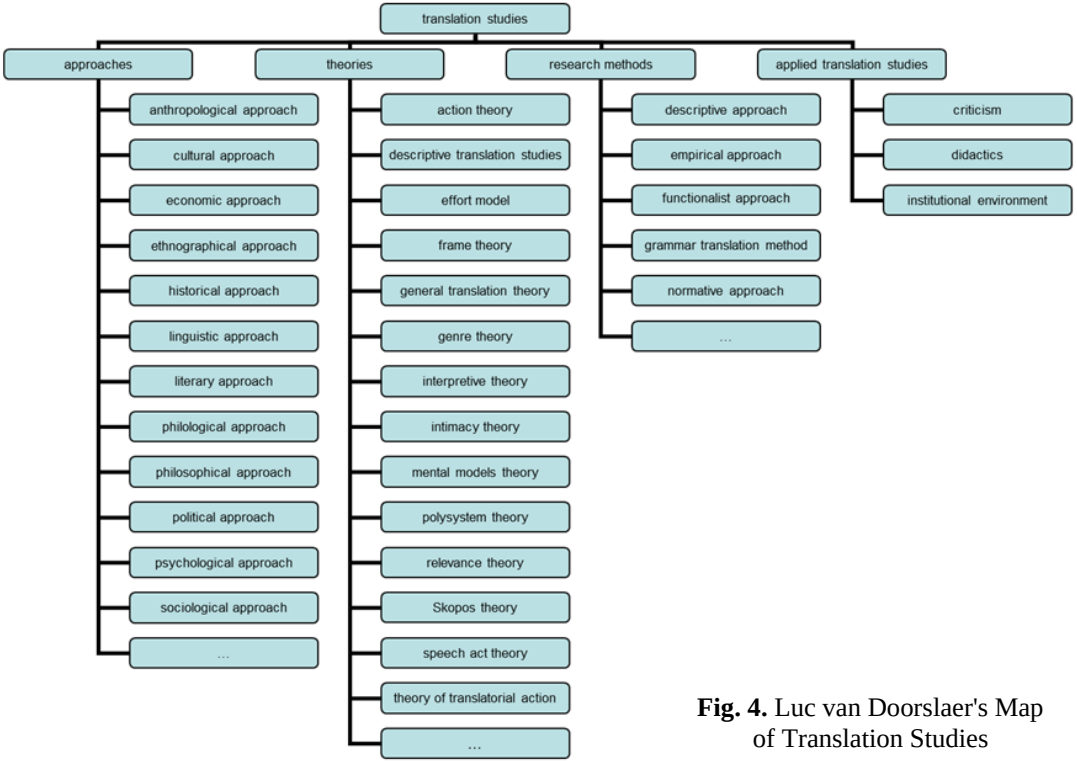

Fig. 4. Luc van Doorslaer's Map of Translation Studies

The recent extensive research in the translation of science and technology texts allows to assume that the theories of scientific and technical translation have all prospects to be developed by contemporary translation scholars, with all the theoretical works being systematised. Such theories need to be created – they will strengthen the theoretical base for translating science and technology as well-demanded translation types that lack a comprehensive methodological research.

As Viacheslav Karaban (Karaban, 2012), the well-known researcher in specialized translation, rightly notes, it is important for special translation theories to form not spontaneously, but in a planned manner. If there only exist special criteria and formation principles, then a theory has all the chances to be established as a separate field of specialized translation within the science of translation.

In his seminal paper, V. Karaban states that the creation of special translation theories is important not only for their systemic formation and further development of Translation Studies but for a proper organization in higher educational institutions of teaching the most needed special types of translation. A special translation theory is devised to establish, describe and interpret the principles, regularities and difficulties in rendering specialized texts. It is to be able to explain the peculiarities of translating specific styles and genres as well as to illustrate the process of specialized translation and to anticipate its outcome (Karaban, 2012, p. 26).

In his article, V. Karaban draws the attention of translation scholars to the necessity of activating *theoretical* research in specialized translation focusing on verifying possible creation of special translation theories. For this, translation theorists working in different subject areas need to intensify their research aimed at formulating a clear and sufficiently complete theoretical base for various types of specialized translation (Karaban, 2012, p. 26).

It is yet to be decided how many theories of specialized translation can and need to be developed. Is it possible to form special translation theories for each of the subject domains? What are the criteria for such formation? Which of the special translation theories deserve priority? (Karaban, 2012, p. 27). These and other questions should be of particular research interest for specialized

translation theorists, as this field of investigation is not so thoroughly developed as the theory of literary translation.

Our future research will focus on substantiating the hypothesis of establishing a theory of science translation (and technical translation in perspective) as a type of specialized translation highly demanded in the market today. We believe that science translation has high research potential with regard to the methods and principles of its translatological analysis that are yet to be formulated.

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НАУКОВИЙ І ТЕХНІЧНИЙ ПЕРЕКЛАД НА НОВІТНІЙ МАПІ ПЕРЕКЛАДУ ТА ПЕРЕКЛАДОЗНАВСТВА

Розглянуто сутність наукового і технічного перекладу, з огляду на природу наукових та технічних текстів. Підсумовано наукові погляди на спільні та відмінні риси цих типів перекладу, підкреслено необхідність їхнього розмежування, не зважаючи на загально-прийнятне вживання терміна "науково-технічний переклад". Зроблено спробу довести, що, хоча науковий та технічний переклад тісно взаємопов'язані, вони не ідентичні та не можуть вживатися один замість одного. Особливої уваги заслуговує дослідження наукового і технічного перекладу як окремих галузей науки про переклад. У статті проаналізовано наявні бібліографічні мапи перекладу і перекладознавства, які підтверджують, що науковий та технічний переклад посіли окреме місце на мапі перекладу, проте поки що не на мапі перекладознавства. Дослідження прогнозує високу ймовірність того, що будуть розроблені окремі теорії перекладу наукових, технічних, а також інших спеціальних текстів, що потребують ґрунтовного методологічного вивчення. Існують усі підстави для створення таких теорій перекладу за умови упорядкування та систематизації сучасних теоретичних розвідок у цій галузі перекладу.

Ключові слова: *наука, техніка, науковий переклад, технічний переклад, бібліографічна мапа перекладу, бібліографічна мапа перекладознавства, теорія наукового перекладу, теорія технічного перекладу.*