



An Analysis of Chinese Translation Strategies of Scientific and Technological Terminologies from the Perspective of Functional Equivalence Theory

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Abstract. Guided by Nida's Functional Equivalence Theory and taking English for science and technology of refrigeration system as the research object, the paper analyzes scientific and technological terminologies and puts forward four translation strategies for Chinese translation of terms: literal translation, free translation and the combination of literal translation and free translation, so as to realize the functional equivalence between the original text and the translation version to the greatest extent, so that the target readers can deeply understand the ideological content of the original text as well as the original readers.

Keywords: Scientific and technological terminologies · Chinese translation strategies · Functional Equivalence Theory

1 Introduction

From the perspective of linguistics, Eugene A. Nida (1969) [1] put forward the famous translation theory of “functional equivalence” according to the essence of translation. The so-called “functional equivalence” refers to the functional equivalence between two languages. Nida believes that “translation is to reproduce the information of the source language from semantics to style in the most appropriate, natural and equivalent language”. [2] Nida's definition of translation points out that translation is not only the equivalence of lexical meaning, but also the equivalence of semantics, and styles. The information conveyed by translation includes both surface lexical information and deep cultural information. The equivalence in “functional equivalence” includes four aspects: equivalent vocabulary, syntactic equivalence, textual equivalence, and stylistic equivalence. In these four aspects, Nida believes that “meaning is the most important, followed by form”. [2] Form is likely to hide the cultural meaning of the source language and

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hinder cultural communication. Functional Equivalence Theory is the core of Nida's translation theory. According to Nida's theory, in the process of translation, the translator should take the four aspects of dynamic equivalence as the translation principle to accurately reproduce the cultural connotation of the source language in the target language.

Nida's "functional equivalence" theory is an objective equivalent translation theory. On the basis of respecting the original text, it pursues the faithfulness and natural expression of the translation and emphasizes the response of the target language readers. In the process of translation practice, the translator should not stick to the vocabulary and grammar of the original text, but pay more attention to the communication effect of the translation in the target language [3].

2 The Application of Functional Equivalence Theory in the Chinese Translation of Scientific and Technological Terminologies

Nida's Functional Equivalence Theory is widely used and plays an important theoretical guiding role in the translation field. Peter Newmark (2001) [4] declared that Nida's "equivalence principle is a very important translation theory, which can be applied to any type of text translation to a certain extent". After translating a large number of scientific English documents, the author finds that functional equivalence translation theory can be well applied to the translation of scientific terms for the following reasons: first, terms mainly convey scientific ideas and meanings. When translating scientific terms, the premise is to express the information contained in these terms through equivalents, which is in line with Nida's concept of "meaning comes first and form second" in functional equivalence. Second, there are many concepts expressed in scientific terminologies that have not appeared in Chinese, or appropriate equivalent terms have not been created. In such circumstance, it is necessary to create new words in translation. It is undeniable that creating corresponding new words is also an effective method in scientific terminology translation. In translation, the translator should not only combine the connotation of the original terms, but also try to conform to Chinese culture, that is, making the meaning of the original terms conveyed by the created equivalent terms not abrupt and blunt, and facilitate readers' acceptance and understanding, which is consistent with the "natural equivalence" and "reader response" advocated by Nida's Functional Equivalence Theory. Third, when translating terms, due to the particularity of terms, transliteration, literal translation plus free translation will be adopted. Transliteration belongs to the direct correspondence of terms. This special translation method will only exist in the special vocabulary of terms, which belongs to formal equivalence to some extent. When there is no concise term corresponding to it from the perspective of content, the simplicity of transliteration conforms to some formal equivalence, it seems to be contrary to Nida's notion "for the first meaning and the second form of terms", but it is in line with the expression of terms and the way readers accept terms. There is no need for readers to carry out mental translation, which is convenient for readers to understand, use this expression and communicate. Therefore, it also meets the requirements of Nida's Functional Equivalence Theory. It pays attention to reader response, and enriches the concept of dynamic equivalence in Nida's Theory.

3 Translation Strategies of Scientific and Technological Terminologies Under the Guidance of Functional Equivalence Theory

With the development of science and technology, the research on scientific and technological terminology translation is increasing in China. As the main information carrier of scientific English, scientific and technological terms have developed together with science and technology. Because terminology is an emerging discipline, there are many researches on scientific and technological terms in China in recent years. The term “expressing or defining scientific concepts through speech or words” (Wei Mengfen, 2014) [5] conveys the author’s ideas to readers, while Nida’s functional equivalence translation theory reproduces the source language information through “the most appropriate and natural equivalence”, so that “the response of the target readers to the target text information is basically consistent with that of the original readers to the original text information” [1].

Taking “Refrigeration System Components” (Sect. 3) “in the book of Refrigeration System and Application” (2010) written by Ibrahim diner & Mehmet kanoglu as the study object, this paper explores the translation strategies of scientific and technological terminologies from the perspective of Nida’s Functional Equivalence Theory.

3.1 Literal Translation

Literal translation refers to translating the literal meaning of terms into “natural and appropriate” equivalent ones. “Since literal translation can clearly and directly reflect the meaning of the original terms, literal translation is generally preferred” [6].

Example 1: Note that a practical refrigeration system may consist of a large range of mechanical and electronic expansion valves and other flow-control devices for small- and large-scale refrigeration systems, comprising thermostatic expansion valves, solenoid valves, thermostats and pressostats, modulating pressure regulators, filter driers, liquid indicators, nonreturn valves and water valves, and furthermore, decentralized electronic systems for full regulation and control.

译文: 请注意, 一个实用的制冷系统可能包括大量的机械和电子膨胀阀以及用于小型和大型制冷系统的其他流量控制装置, 包括恒温膨胀阀, 电磁阀, 恒温器和压力调节器, 调制压强调节器, 过滤干燥器, 液体指示器, 止回阀和水阀以及用于全面调节和控制的分散式电子系统。

There are a large number of terms in this sentence, which can be translated directly, especially “nonreturn valve”. At the beginning of translation, the term is literally translated as “不可返回阀”. By consulting the standard terms on the website of www.termonline.cn, it is found that it should be translated as “check valve”, which is more concise and professional. Similarly, “Water valve” is literally translated into “水阀”. The equivalent translated during review is the same as the standard term. Similarly, the terms “thermostatic expansion valve”, “solenoid valve”, “filter driver” in this sentence are also literal translated by as “恒温膨胀阀”, “电磁阀” and “过滤干燥器”. The above scientific terminologies can find equivalent terms in Chinese through their own literal meaning. In addition, most of the terms appearing in the translation materials can be

directly translated into “appropriate and natural” equivalent terms in line with Chinese expression through the literal meaning of English terms, which also comes from the use of literal translation to facilitate back translation and facilitate foreign exchange.

3.2 Free Translation

Free translation refers to translating terms that are more in line with the habits of the target readers’ mother tongue according to the extended meaning or working principle of the original terms and the conceptual equivalence expressed. The purpose of free translation is to avoid misinterpreting the original meaning or translating the equivalent into less “natural” way. That is, when literal translation is not enough to express its professional meaning, free translation can be applied.

3.2.1 Addition Translation

Addition translation is to add words according to the needs of expressing concepts and contents in terminologies in translation, so as to be faithful.

Naturally express the ideological content of the original term and make the target language more in line with the reading habits of the target language readers. “The principle of addition translation is that although words are added, the meaning not contained in the original language cannot be added” [7].

Example 2: The incorporation of hybrid bearings in compressor designs allows the refrigerant itself to be used as the lubricant.

译文：将动静压混合轴承安装到压缩机的这一设计可以使制冷剂起到润滑剂的作用。

During the initial translation process, the author translated “hybrid bearing” into “混合轴承”. During the review process, according to “the Chinese standard terminology” published by the National Science and Technology Terminology Review Committee, the reviewer of the standard terminology is the mechanical engineering terminology Review Committee. The corresponding specification term of “hybrid bearing” shall be “动静压混合轴承”, and the term is defined as: sliding bearing that can work under hydrostatic lubrication and hydrodynamic lubrication, and sliding bearing that can work under hydrostatic lubrication and hydrodynamic lubrication at the same time. (See “The Mechanical Engineering Terminology” published by the Science Press in 2001).

The translation of normative terms adds the concept of “dynamic and static pressure”, and makes the meaning of “mixing” concrete, making it easier for target language readers to understand.

3.2.2 Semantic Translation of New Words

“In recent years, new disciplines, new theories, new concepts and new technologies of science have been emerging. According to incomplete statistics, thousands of new terminologies appear every day”. [5] The fast updating speed of terms leads to the fact that the dictionary and the standardized terms released by the National Science and Technology Terminology Review Committee are not able to catch up with it. Therefore, non-professionals cannot determine the equivalent terms due to the lack of normative

tools during translation process. In that case, they need to translate according to the original concept and meaning expressed in the specific context and specialty.

When translating the term “traxoil”, it failed to find the dictionary, term library, standard terms and professional books. Finally, it was learned that “traxoil” was obtained by consulting experts about the performance and application of the component.

The principle of the components referred to is to ensure the oil level of the compressor and balance the oil level by controlling the return of refrigerant oil to the compressor.

Therefore, according to its principle, the author of this paper finally determines that the equivalent term of “traxoil” should be translated into “油位平衡器” (oil level balancer).

The above terms are new, and the standard terms and even the online dictionary are not updated in time. Therefore, when translating such terms, translators must ensure the professionalism and accuracy of the terms. If the equivalence of content and form cannot be met at the same time, the concept of the terms should be accurately expressed, which is consistent with the concept of content coming before form in Nida’s Functional Equivalence Theory. However, it should be noted that when using this method to translate terms, it must be reviewed by professional experts in this field, and the translation results must be recognized by experts.

3.3 Literal Translation + Free Translation

The method of literal translation + free translation, as the name suggests, is that term translation uses both literal translation and free translation. Most of these terms are multi word terms, in which a word is determined according to free translation, and the overall structure adopts literal translation.

Example 6: Reciprocating compressors have, until now, carried the workload in applications requiring temperatures below -350 C . This was the technology of choice, mainly because cascading refrigeration systems was the only choice.

译文: 迄今为止, 往复式压缩机在制冷应用中要求制造低于 -350 C 温度的制冷负荷。之所以其成为首选技术, 主要是因为复叠式制冷系统是唯一的选择。

“Cascading revision system” has no clear equivalent terms in the dictionary and standard term-base, but structurally, the term certainly adopts the method of literal translation. There is no doubt that the core difficulty in translation is the determination of the equivalent terms of “cascading”. In the dictionary, “cascading” has the translation of “cascade” and “cascade” and “overlap” in the online terms. They belong to the fields of communication science and technology, electric power and computer science and technology respectively. There is no translation result related to the refrigeration field. Because there is no standard terminology, the author of this paper translates them into “联级制冷系统” (combined refrigeration system) at the time of initial translation. During the review, after consulting experts, it is learned that: in general, water cooling and air condensation are used for refrigeration, but the condensation temperature of low-temperature refrigerant is lower, so it is necessary to condense low-temperature refrigerant with artificial refrigeration source, which leads to the “cascading refrigeration system”, which uses two kinds of refrigerants at the same time. Its principle is that the refrigeration circuit

overlaps when passing through the condensation evaporator. After consulting the professional book named Refrigeration and Heat Pump Technology [8], the translator learned that in the field of refrigeration, the professional term of this overlap should be “overlap”. Therefore, the “cascading” is finally translated into “复叠”. Therefore, the equivalent term of “cascading refrigeration system” is finally determined as “复叠式制冷系统”.

Example 7: In some larger applications, centrifugal or turbine compressors are used, which are not positive displacement machines but accelerate the refrigerant vapor as it passes through the compressor housing.

译文: 在一些较大的应用中, 会使用离心或透平压缩机, 它们不同于容积式机器, 而是在制冷剂蒸气穿过压缩机壳体时加速制冷剂蒸气.

Initially, “turbine compressor” has been translated into “涡轮压缩机”. During the review process, it is verified that “turbine” can also be transliterated as “透平”. In order to be scientific and rigorous, the author looked up the term in the dictionary. It shows that turbine is a general term, which refers to the mechanical device that uses fluid impact to rotate the rotating impeller to generate power. “Turbine” comes from “turbo”, which means rotating object, “turbine” is an English transliteration, the transliteration of “turbine” generally refers to the turbine (source network) in the field of thermal power. Refrigeration and heating are interconnected. The professional translation in refrigeration is to transliterate “turbine” into “透平”, not “涡轮压缩机”, which has also been confirmed by professionals. Therefore, the literal translation of “turbine compressor” into “涡轮压缩机” in this field is not the most appropriate, so the author finally transliterates “turbine compressor” into “透平” through transliteration.

In order to ensure the accuracy of term translation, the author further searches the literature. “Freon turbine” should be transliterated into “氟利昂透平” [9] “Centrifugal refrigerating machine driven by freon turbine”, conventionally known as “氟利昂透平离心式制冷机”. Freon is a kind of refrigerant. The convention that “Freon turbine” is translated into “氟利昂透平” further indicates that “turbine” is translated into “透平” in the refrigeration field. It’s easier to understand and more professional.

The above examples show that if such terms are translated freely, it will not show the professionalism and accuracy of the original terminologies, which will expand the concept of terms. Transliteration will make it easier for the target language readers in this field to understand. At the same time, it can also provide the most professional and accurate translation for beginners in this field. Meanwhile, transliteration has achieved formal equivalence to some extent. These two points, taking both content and form into account, are in line with Nida’s translation concept of Functional Equivalence Theory.

4 Conclusion

According to the above analysis, there is no absolute functional equivalence, but relative equivalence. Nida’s Functional Equivalence Theory plays a guiding role in the translation of scientific and technological terms, but it is not a universal “master key”. In translation practice, specific problems should be analyzed accordingly in translation practice. In translation practice, specific problems should be analyzed in detail, and the original style should not be lost only for the sake of equivalence. In the translation of scientific and technological terms, reluctant equivalence will cause the target readers to lack the

aesthetic feeling of the original text. When translating English terms into equivalent terms in Chinese, if the equivalence in form and meaning can be achieved at the same time, it is the maximum equivalence mentioned by Nida. However, if the two aspects cannot be met at the same time, it is necessary to consider the rigorous and scientific nature of terms, the unity and readability of terms, and translate them through content equivalence or voice pairs. To the greatest extent, the target readers can learn and understand the ideological content of the original text as well as the original readers.

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