

An Analysis of the English Translation of Scientific and Technological Terms from the Perspective of Eco-translatology - A Case Study of the 2025 Report on the Work of the Government

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Abstract:

With the increasing globalization of scientific and technological development, sci-tech terms have emerged like mushrooms after rain, becoming a key element in cross-cultural sci-tech exchanges. Sci-tech terms in the 2025 Report on the Work of the Government demonstrate China's strategic layout and innovative development in the field of science and technology. Guided by the theory of Eco-translatology, this paper conducts an analysis of the translation adaptation and selection strategies of these sci-tech terms from the linguistic dimension, cultural dimension and communicative dimension. It aims to provide an effective path for the translation of sci-tech terms, promote the smooth and in-depth exchange of sci-tech information.

Keywords:

Eco-Translatology, Sci-Tech Terms, Report on the Work of the Government, Three-Dimensional Transformation

1. Introduction

In an era of rapid advancement of science and technology, innovation is progressing at an unprecedented pace. New scientific concepts, ideas, and technologies continue to emerge, giving rise to a large number of sci-tech terms. the 2025 Report on the Work of the Government mentions a series of such terms, including “zero-based budgeting reform” and “gazelle companies”. These terms not only vividly reflect the new trends in China's scientific and technological development but also demonstrate the country's strategic vision of proactively planning and seizing opportunities in the global sci-tech competition.

Accurate translation of these terms is essential for conveying China's vision for sci-tech development on the international stage and promoting international exchange in

sci-tech achievements. Eco-translatology, a theory proposed by Professor Hu Gengshen in 2001, provides an emerging and dynamic perspective for the translation of sci-tech vocabulary. It helps address various challenges encountered in the translating process. By applying this approach, translators can enhance the accuracy, fluency, and cultural adaptability of their work, thereby facilitating the global dissemination of sci-tech information.

2. The Theory of Eco-translatology

In 2001, Professor Hu Gengshen of Tsinghua University first proposed the concept of “Eco-translatology,” which emphasizes that translators should pay attention to the differences between the source language and the target language in translation activities. [1] Inspired by Darwin’s theory of evolution, it builds a translation ecosystem that accommodates linguistic differences through ecological rationality and from an ecological perspective. [2] Its theoretical framework originates from the reflection on traditional translation paradigms and the integration of ecological principles such as “interdependence and dynamic balance.” It aims to address new translation challenges in the context of globalization and cultural diversity, providing ecologically rational guidance for translation research and practice. Eco-Translatology defines translation as “a selective activity of the translator’s adaptation to the translational eco-environment,” wherein the “translational eco-environment” refers to the sum of internal and external factors influencing translation activities, including dimensions such as language, culture, society, politics, and economy. This forms a dynamic ecosystem centered on the “translation subject - translation object - translation environment.” As research progresses, the “translation eco-environment” is more precisely defined as the dynamic system constituted by the source text, source language, and target language—namely, an interconnected and interactive whole comprising linguistic, communicative, cultural, and social elements, as well as the author, reader, and client. [3] The theory emphasizes the integrity and dynamism of the translational ecosystem, which continuously evolves in response to the development of society and changes in reader’s expectations.

Meanwhile, with “adaptation” and “selection” as its core logic, Eco-Translatology has established a three-dimensional framework covering the “linguistic, cultural, and communicative dimensions.” This framework was elaborated and exemplified by Professor Hu Gengshen in 2006. Within this theory, the translator transcends the traditional passive role centered on the source text to become an active agent and in the translation ecosystem. The translator must first “adapt” to the translational eco-environment, particularly by deeply understanding the linguistic and cultural ecology of the source text and the anticipated reception context of the target text, thereby accurately grasping the needs and constraints of the ecosystem. Subsequently, based on personal translation motivations and textual characteristics, the translator “selects” appropriate translation strategies, making balanced considerations across the linguistic, cultural, and communicative dimensions. Through subjective regulation of the translational eco-environment, the translator ultimately produces a target text that aligns with the ecological requirements of the target language, ensuring the realization of its function and value in the target context.

The development of the theory has primarily undergone two phases. The inaugural phase, spanning from 2001 to 2008, was primarily dedicated to the proposition and foundational construction of Eco-translatology. A landmark achievement of this period was the publication of Professor Hu Gengshen’s 2008 article, “An

Interpretation of Eco-translatology,” which interpreted the theory from the perspectives of its fundamental tenets, genesis, and research status. [4] The second phase, from 2009 to the present, has witnessed an explosive growth in the application and research of Eco-translatology. [5] Since then, the theoretical system of Eco-translatology has been gradually improved and developed. In recent years, it has attracted more attention from the international translation community, and has interacted and integrated with other translation theories, making its connotation more rich. The theory of Eco-translatology has expanded the interdisciplinary perspective of translation research, provided operable practical paths for various translation fields, and demonstrated strong theoretical vitality and application prospects. This paper will mainly discuss around the linguistic dimension, cultural dimension and communicative dimension.

3. Translation of Scientific Terms and the Report on the Work of the Government

Compared to other styles, the sci-tech English style is characterized by distinct communicative and informative features. [6] Sci-tech terms refers to specialized linguistic symbols in the field of science and technology. Its primary purpose is to accurately convey professional information, featuring concise, clear, and precise wording, with established expressions and terminology that often appear as proper nouns. Its application is strictly confined to professional contexts, and its meanings rarely change over time. Scientific and technical translation covers a wide range of fields, including areas such as artificial intelligence, algorithms and software development in the computer, as well as technical documentation for mechanical equipment and automation. It also encompasses specialized translation in disciplines such as medicine, architecture, agriculture and renewable energy technology. The translation of sci-tech terms must comply with relevant industry standards and allows no room for arbitrary interpretation. Additionally, its target audience is mostly professionals or readers seeking information, so the translation should also prioritize readability and ease of comprehension.

The Report on the Work of the Government summarizes China’s overall development over the past year and provides guidance for the work of the coming year. As a representative and distinctive political text in China, its content covers China's politics, economy, culture, social life and other fields. [7] It not only has important news, economic and political value, but also serves as an effective material for learning political translation. As a crucial carrier of official discourse, the new scientific and technological terms appearing in the Report indicate new industry trends and opportunities. These terms represent innovative achievements or novel development models in cutting-edge sci-tech fields, carrying substantial weight and providing instructive guidance for professionals across various sectors of society. Therefore, accurate and high-quality translation of these new scientific terms in the Report facilitates information exchange between domestic audiences and the international community, playing an indispensable role in shaping the national image and promoting cross-cultural communication. Based on the three-dimensional transformation in Eco-translatology as the theoretical perspective, this paper explores the translation strategies and techniques of the sci-tech terms in the 2025 Report on the Work of the Government in terms of linguistic expression, cultural connotation and communicative function realization.

4. Translation Strategies for Sci-Tech Terms from the Perspective of Eco-translatology

4.1. Linguistic Dimension

The transformation on the linguistic dimension refers to the translator's process of selectively adapting and transforming linguistic forms. For the effective conveyance of the original text, this transformation should be multi-faceted and occur at multiple levels. [8] It involves adjustments to vocabulary, grammar, sentence structure and other aspects of the source text to minimize differences between the translation and the original. It mainly focuses on the surface structure and formal characteristics of language, including lexicon, grammar, syntax, and rhetorical devices.

Example 1

ST: 零基预算改革

TT: zero-based budgeting reform

The literal translation of “零基预算改革” as “zero-based budgeting reform” fully reflects the core idea of linguistic dimensional adaptation in the eco-translatology theory. This approach is not merely a word-for-word correspondence, but an adaptive choice made after in-depth consideration of the differences in linguistic forms, cultural connotations and usage ecology between Chinese and English. In terms of linguistic form, “零基预算改革” is an attributive-head structure. While retaining the Chinese structure, the target text “zero-based budgeting reform” strictly follows the grammatical habit of using nouns as attributes in English, achieving a neat parallelism in linguistic form. Moreover, it is not a concept originally created in Chinese, but a common budgeting method in the international financial field. Therefore, it is necessary to follow the conventional term expression, namely zero-based budgeting.

Example 2

ST: 瞪羚企业

TT: gazelle companies

The term “瞪羚” is a general term for multiple genera and species under the Bovidae family and Antilopinae subfamily. These animals mainly distribute in grasslands, deserts and open woodlands in Africa and Asia. Inhabiting these sparsely populated areas means that gazelles are naturally inclined to run, renowned for their remarkable speed and physical agility. “瞪羚企业” is a figurative term, referring to small and medium-sized enterprises with high-speed growth and strong innovation. The phrase “gazelle companies” has, in fact, already been established within English-speaking contexts. Both the Chinese and English expressions of this phrase adopt modifier-head noun structure, conforming to the common English syntactic habit of using nouns attributively.

In the English context, the attribute of “speed and agility” with “gazelle” is a consensus based on its biological characteristics. Readers can quickly grasp its meaning without additional knowledge of specific cultural backgrounds, as this metaphorical sense highly aligns with that in the source language. There is no “cultural barrier”, thus eliminating the need for further annotation. This transformation avoids the comprehension obstacles caused by “cultural default” while preserving the source language's underlying logic of using an animal metaphor.

Consequently, the translated term can stand independently within the target language's cultural ecology while accurately conveying the conceptual meaning of the source term.

4.2. Cultural Dimension

In the theoretical system of Eco-translatology, Translation is far from being a mere act of linguistic conversion, rather, it is an activity deeply rooted in cultural soil.[9] The cultural dimension in Eco-translatology focuses on exploring how to cross linguistic barriers and accurately convey the cultural connotation of the source language. Significant differences exist because the source and target languages involve distinct national cultures. During the translation process, when dealing with words, allusions, metaphors and other elements with cultural specificity, translators should adopt various strategies such as annotation, free translation and substitution to navigate the differences between the source and target cultures. The objective is to enable target-language readers to achieve a textual experience, including cultural resonance and perception, equivalent to that of the source-language readers, thereby faithfully transmitting the cultural elements embedded in the original text.

Example 3

ST: 北斗应用

TT: applications of the BeiDou Navigation Satellite System

The term “北斗” is transliterated as “BeiDou”, preserving the Chinese cultural content. “北斗” originates from the astronomical cultural image of the “Big Dipper (北斗七星)” in ancient China, which has long served as a natural guide for the Chinese people to identify directions since ancient times. It carries the traditional understanding of cosmic order within Chinese civilization and is a proper noun imbued with profound traditional cultural connotations. However, if it were translated merely as “Beidou applications”, target language readers, especially those unfamiliar with Chinese culture or the aerospace field, may encounter comprehension obstacles due to the lack of cultural background, failing to associate “BeiDou” with its core attribute of “navigation system”. By supplementing “Navigation Satellite System”, the target text clarifies the technical attribute of “BeiDou” while retaining its transliteration. This approach avoids the loss of cultural image and simultaneously provides crucial information for the target language's cultural ecology. This method allows the technologically relevant concept of “北斗,” marked by Chinese cultural imprint, to be accurately identified and understood within the scientific and cultural context of the target language. It enables the concept of “北斗应用” to integrate naturally into the cultural ecology of international scientific exchange. Furthermore, it prevents communication barriers caused by expressions inconsistent with the target language's cultural norms, realizing “cultural adaptive selection”. This aligns precisely with the core requirement of the “cultural dimension” in Eco-translatology, which emphasizes “the translator's transmission of cultural connotations and their adaptive transformation.”

Example 4

ST: “嫦娥六号”

TT: the Chang'e-6 mission

The translation of “嫦娥六号” as “the Chang'e-6 mission” establishes an “ecological balance” between the source culture (encompassing both traditional Chinese culture and contemporary aerospace culture) and the target culture (the context of international space exploration communication) by preserving the cultural symbol while adapting it to the target language context. “嫦娥” is a culture-loaded term deeply rooted in classical Chinese mythology, with the legend of “Chang'e Flying to the Moon (嫦娥奔月)” existing since ancient times. This legend embodies the beautiful imagination and romantic sentiment of the Chinese people throughout millennia regarding “ascending to the heavens to embrace the moon.” In modern times, the Chinese people have transformed this legend into reality, taking it as the core cultural identifier for China’s lunar exploration program. If translated as “Moon Goddess-6,” it would dismantle the cultural symbol, failing to resonate with the Chinese people and hindering the international dissemination of this classic culture. Therefore, adopting a transliteration approach ensures that the mythological connotations and national sentiment represented by “嫦娥” in the source culture are not diluted. It also enables this symbol with distinct Chinese cultural attributes to be recognized in the international cultural context, realizing the “faithful transmission” of cultural meaning.

4.3. Communicative Dimension

As the name suggests, the communicative dimension involves interactions between people. Its adaptation and selection refer to building upon the achievement of the previous two dimensions—information transformation at the linguistic dimension and transmission of implied content at the cultural dimension—by shifting the core focus of transformation in translation practice is placed on the communicative level. It aims to achieve the optimal maintenance of the communicative ecology between the two languages, ensuring that the target text can effectively fulfill its communicative function within the target language context. In sci-tech translation, translators must convey the hidden communicative intentions in terms and accomplish the mission of these terms regarding their communicative function.

Example 5

ST: 具身智能

TT: embodied AI

“具身智能” is a term originating from the intersection of cognitive science and artificial intelligence, whose core concept refers to a form of intelligence that “emphasizes the dependence of intelligence on the interaction between the body and the environment.” First proposed in 1950, this concept highlights that intelligent agents generate intelligent behaviors through the interaction between their bodies and the environment. In the national artificial intelligence development strategy, “具身智能” is the only way to enable artificial intelligence to interact beyond the digital and physical worlds. Instead of literal translation as “embodied intelligence”, the target text adopts “embodied AI”. It retains the core qualifier “embodied” to accurately convey the essential attribute of “body-environment interaction” and avoid conceptual distortion. Replacing the broad term “intelligence” with “AI” (Artificial Intelligence) anchors the term firmly within its application context, i.e., the field of artificial intelligence. This approach allows target language readers, especially researchers and practitioners in AI field, to quickly identify the field to which the term belongs. They do not need to additionally speculate on the vague scope of “intelligence” (such as whether it includes biological intelligence), which greatly reduces the information decoding cost in cross-disciplinary communication. It meets the requirement of the

Communicative Dimension for “ensuring the efficient transmission of core information”.

Example 6

ST: 好房子

TT: quality house

The Chinese character “好” is an imprecise, everyday evaluative term. When used as an adjective preceding “房子” (house), it can simultaneously encompass multiple meanings such as “high quality, good layout, desirable location, and high cost-effectiveness.” In the 2025 Report on the Work of the Government, this term appears in the sentence: “适应人民群众高品质居住需求，完善标准规范，推动建设安全、舒适、绿色、智慧的‘好房子’。” (“To meet the people’s demand for high-quality living, we will improve standards and regulations, and promote the construction of safe, comfortable, green, and smart ‘好房子’.”) Obviously, “好房子” here is specifically marked with quotation marks, indicating that its meaning extends beyond the literal surface level and alludes to the previously mentioned “demand for high-quality living.” The English equivalent of “好” is “good”, but as analyzed earlier, the word “good” has deviated from the true connotation of the original text. If literally translated as “good houses” without processing, target language readers will be confused by the vagueness of “good”. They would be unable to pinpoint the specific aspects of “good” being referred to and would fail to generate the same associations as source-language readers (i.e., Chinese readers), resulting in blurred core communicative information. The target text uses “quality” instead of “good”, focusing the imprecise evaluation on “the quality attributes of the house itself”, such as construction quality, building material standards, and residential durability. This avoids ambiguous interpretation of “好” by target language readers and accurately conveys the genuine meaning intended in the original text.

5. Conclusions

The translation of sci-tech terms, especially those appearing in important official documents, requires translators to strictly grasp their characteristics, abide by industry terminology conventions, and faithfully convey the connotation of the original vocabulary. By applying the three-dimensional transformation theory of Eco-translatology to analyze the translation of scientific vocabulary in the 2025 Report on the Work of the Government, it becomes evident that the linguistic, cultural, and communicative dimensions provide a novel and effective perspective for such research, breaking free from rigid and inflexible analytical templates. In the translation process, translators can place themselves in a “translational ecology” to achieve the “dynamic change” in their practice. In summary, the translation of sci-tech terms is not only a “hard” task of language conversion, but also a “soft” project of cultural communication and exchange. The translation practice of the Report provides vivid corpus support for the three-dimensional transformation theory under Eco-translatology. However, this study also has certain limitations. For instance, the scope of the research object is limited. The article only extracts six typical terms from the Report, leaving other equally important terms unanalyzed, and the coverage of fields remains insufficiently broad. Future research should expand the corpus scope and investigate translation variations across different scientific and technological fields. This will enhance personal translation proficiency and continuously optimize the translation practice process. Looking ahead, as China’s scientific prowess

strengthens and international exchanges deepen, the translation of sci-tech terms will play a more important role in spreading Chinese culture and fostering global scientific collaboration. Eco-translatology will provide theoretical guidance in this process, contributing to building a new pattern of cross-cultural communication driven by “science and technology + culture”.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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