



A Brief Analysis of the Chinese Translation Formula of Petroleum Science and Technology English Texts under the Guidance of Skopos Theory

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Abstract

As a non-renewable precious resource, oil has a direct impact on the production and development of countries around the world. At this time, China's oil resource demand is highly dependent on foreign countries, and many oil development technologies and experience still lag behind the world to a certain extent. Therefore, efficient cross-cultural communication will undoubtedly inject impetus into China's petroleum science and technology to keep pace with The Times and further innovate. In addition to the difficulty of the translation of petroleum science and technology texts, which cover a large number of technical concepts of the industry, the difference in the order of sentence components between the Chinese and English texts, that is, the translation and the original text, is an important factor affecting the speed of ordinary readers and even professionals (translators) to obtain accurate information. Under the guidance of the three principles of Skopos Theory, this paper first analyzes the characteristics of petroleum science and technology text, then analyzes and compares the components of typical sentences in the text, and tries to explore some translation experience.

Subject Areas

Culture, Economics, Linguistics

Keywords

Skopos Theory, Differences between English and Chinese, Petroleum Science and Technology Text, Sentence Component

1. Introduction

Petroleum is not only related to national development, but also to people's livelihood. Upon consideration, some advanced foreign petroleum exploitation technology and experience have a very important reference value for the development of China's petroleum field, so the efficient translation and understanding of English texts of petroleum science and technology is of great importance. It is worth mentioning that, in addition to the main sentence, petroleum science and technology texts contain more modifiers, which convey more and more complex information, the greater the importance of the sentence, which often states some specific operation process or definition, whether for translators or readers, understanding this information is the most important.

For example, as for this sentence "Scenarios are created to generate variances in reservoir performance *affecting the timing of events requiring intervention, reservoir monitoring or reservoir management* and *are often driven by geological uncertainty and reservoir heterogeneity*", there are modifiers in this sentence in which, this part "affecting the timing of events requiring intervention, reservoir monitoring or reservoir management" modifies the noun "performance", and the other part "are often driven by geological uncertainty and reservoir heterogeneity" modifies the subject noun "Scenarios". These modifiers convey some important information that include introductions of technical procedures in an industry, and that makes them significant and also lets the text become complicated, and the false apprehension for them may trigger an inferior job by translator or reader.

From a micro point of view, this paper focuses on translation itself, analyses the differences in the arrangement of sentence components between English and Chinese from the perspective of grammar, and summarizes some skills or experience from practice.

A Review of Previous Studies on English Translation of Petroleum Science and Technology Texts

The translation of petroleum science and technology texts from English has gained increasing attention in recent years, owing to the growing importance of the petroleum industry in the global economy. This review summarizes the key findings and approaches explored in previous studies, highlighting the challenges and strategies employed in translating such specialized texts.

Initially, it's noteworthy that the evolution of the petroleum industry, particularly the emergence of new technologies and terminologies, has significantly impacted translation practices. For instance, the advent of digital oilfields (DOF) and other related concepts like Integrated Operations (IO) has introduced new terminologies that require precise translation. These terms reflect the industry's shift towards digitization, necessitating a nuanced understanding of both the technical and linguistic aspects of these innovations.

Previous research has emphasized the importance of text type theories in

guiding the translation of petroleum science and technology texts. These theories, originating from the work of translation theorists like Katharina Reiss, categorize texts into different types based on their primary function: informative, expressive, or operative. Petroleum science texts often fall into the informative category, prioritizing the accurate conveyance of information over stylistic or emotional considerations.

Within this framework, studies have focused on developing effective translation strategies. One such strategy is the use of explicitation, where implicit information in the source text is made explicit in the target text to enhance clarity and readability. This is particularly relevant in petroleum science texts, where complex technical information needs to be communicated clearly and accurately.

Another significant aspect explored in previous research is the handling of long and complex sentences, which are commonplace in petroleum science and technology texts. Studies have advocated for the use of restructuring techniques to simplify these sentences and improve readability in the target language, while preserving the original meaning.

Furthermore, the translation of petroleum-related terms has been a focal point of several studies. The accuracy of terminology translation is crucial in ensuring that the technical nuances and specificities of the source text are preserved. To this end, researchers have emphasized the need for translators to have a solid understanding of the petroleum industry and its terminology.

In conclusion, the translation of petroleum science and technology texts requires a high degree of specialization and technical knowledge. Previous studies have laid a solid foundation for understanding the challenges and developing effective translation strategies. However, there is still scope for further research, particularly in exploring new methodologies and technologies that can further enhance the accuracy and efficiency of these translations.

2. Feature Analysis of English and Chinese Petroleum Science and Technology Texts

As professional texts under their respective language systems, petroleum Science and Technology English and Chinese texts have their own unique linguistic features and expressions. These two kinds of texts not only carry the knowledge and information in the field of petroleum science and technology, but also embody the cultural connotation and subject characteristics of the language [1]. The following is an in-depth analysis of the features of English and Chinese petroleum science and technology texts.

2.1. Features of Petroleum Science and Technology English Texts

Petroleum science and technology texts exhibit several implicit characteristics that are crucial for accurate understanding and translation. These characteristics, often overlooked, hold the key to unlocking the technical depth and precision embedded within these texts.

2.1.1. Technical Terminology and Jargon

Petroleum-related texts are rich in technical terminology and jargon. These terms, specific to the oil and gas industry, carry precise meanings that are essential for accurate communication. For instance, terms like “OIP (oil in place)” and “RH (relative humidity)” convey specific information about underground oil reserves and environmental conditions, respectively. The translator must possess a thorough understanding of these terms to ensure accurate conveyance of information [2].

2.1.2. Complex Sentence Structures

These texts often feature long and complex sentences, reflecting the intricate nature of the subject matter. These sentences require careful dissection to preserve their original meaning during translation. For example, a sentence discussing the various stages of oil extraction might span multiple clauses and phrases, each detailing a specific step or condition.

2.1.3. Implicit Logical Relationships

The logical relationships between sentences and paragraphs might not always be explicitly stated. Understanding these implicit connections is crucial for comprehending the overall narrative. For instance, a discussion on drilling techniques might implicitly lead to a discussion on safety measures, without an explicit segue.

2.1.4. Context-Dependent Meanings

Certain terms and expressions in petroleum science and technology might have different meanings depending on the context. This requires the translator to have a keen understanding of the subject matter and the ability to interpret these contextual nuances accurately.

2.1.5. Precision and Accuracy

Petroleum science and technology texts demand a high degree of precision and accuracy. Any misinterpretation or mistranslation can lead to significant misunderstandings or even safety hazards. Therefore, the translator must approach these texts with utmost care and attention to detail.

2.1.6. Use of Metaphors and Analogies

To make complex concepts more accessible, authors often employ metaphors and analogies. These figurative devices, while enhancing readability, can pose challenges during translation. The translator must identify and adapt these metaphors to ensure cultural and contextual relevance in the target language [3].

In conclusion, the implicit characteristics of petroleum science and technology texts demand a high level of expertise and attention to detail from translators. By understanding these characteristics and employing appropriate translation strategies, translators can ensure accurate and effective communication of technical information within this specialized domain.

2.2. Features of Chinese Petroleum Science and Technology Texts

2.2.1. Rich Vocabulary and Polysemy

As a kind of ideographic writing, Chinese has a rich and varied vocabulary, and polysemy is common. In the Chinese text of petroleum science and technology, the same word may have different meanings and usages, which need to be accurately understood according to the context. In addition, the Chinese language is also good at using metaphors, personification and other rhetorical devices to enhance the expression effect and make the text more vivid [4].

2.2.2. Sentence Patterns are Flexible and Changeable

Compared with English for petroleum science and technology, Chinese text has more flexible sentence patterns. Chinese sentences can express different semantic meaning and mood by adjusting word order and adding function words. This flexibility enables Chinese text to be closer to readers' habits of thinking and understanding when expressing complex scientific and technological concepts.

2.2.3. Profound Cultural Connotations

As the cultural carrier of the Chinese nation, Chinese language contains rich cultural connotation and historical accumulation in its texts. The Chinese texts of petroleum science and technology not only reflect the knowledge and technology in the field of petroleum science and technology, but also reflect the thinking and exploration of the Chinese nation on the development and utilization of energy. This cultural connotation makes the Chinese text not only convey the scientific and technological information, but also have profound cultural value.

2.3. Similarities and Differences between English and Chinese Texts on Petroleum Science and Technology

The English for Petroleum Science and Technology and the Chinese text have some commonalities in expressing knowledge and information in the field of petroleum science and technology, for example, they both pay attention to accuracy, objectivity and professionalism. However, due to the differences in language system and cultural background, there are obvious differences between the two texts in terms of vocabulary, sentence pattern and cultural connotation. In the process of translation, these differences need to be fully considered and appropriate translation strategies and methods should be adopted to ensure the accuracy and readability of the translated text [5]. To sum up, English and Chinese petroleum science and technology texts each have their own unique linguistic features and expressions. In translation and practical application, we need to understand these features and master translation skills and methods in order to better convey knowledge and information in the field of petroleum science and technology.

3. Skopos Theory of Translation

Hans Vermeer put forward the skopos theory of translation, which believes that

translation is a purposeful and fruitful act based on the original text, which must be completed through negotiation, and translation must follow a series of laws: the principle of purpose, the principle of coherence, and the principle of fidelity. skopos theory holds that the first principle followed by all translation activities is the “skopos rule”, that is, translation should be able to function in the context and culture of the target language in the way expected by the target language recipient. The goal to be achieved determines the whole process of translation, that is, the outcome determines the method. Coherence rule means that the translation must meet the standard of intra-textual coherence, that is, the readability and acceptability of the translation, which the recipient understood and was meaningful in the culture of the target language and the communicative context in which the translation was used. The fidelity rule means that there should be inter-textual coherence between the original text and the translation [6].

The application of Skopos Theory on petroleum science and technology text translation

Skopos theory, as an important translation theory, emphasizes the purposefulness of translation, that is, translation strategies and methods should be determined according to the specific purpose of translation. The application of Skopos theory is particularly important in the translation of petroleum science and technology texts, because such texts involve a large number of technical terms, complex technical descriptions and accurate data analysis, requiring the translation to accurately convey the original information and conform to the reading habits and expression habits of the target language readers.

First of all, the translation of petroleum science and technology text needs to accurately convey the professional terms and technical information in the original text. This requires the translator to have a deep understanding of the relevant knowledge in the field of petroleum science and technology and grasp the exact meaning and usage of professional terms in the translation process. Under the guidance of Skopos theory, translators should choose appropriate translation strategies according to the purpose of translation and the needs of the target language readers, such as literal translation, free translation or borrowed translation, so as to ensure the accuracy and professionalism of the translation.

Secondly, the translation of petroleum science and technology texts needs to pay attention to logic and orderliness. This kind of text often contains a lot of technical description and data analysis, which requires the translator to keep a clear mind in the translation process to ensure the logic and organization of the translation. Under the guidance of Skopos theory, the translator should make proper adjustment and reorganization of the original text according to the purpose of translation and the reading habits of the target language readers, so as to make the translation easier to understand and accept.

In addition, the translation of petroleum science and technology texts also needs to pay attention to the standardization and idiomatic language. The language of this kind of text is usually more formal and objective, requiring the translator to use standardized language expressions in the translation process,

avoiding the use of colloquial or slangy words. At the same time, the translator should also pay attention to the language habits and expressions of the target language to make the translation more authentic and natural. In the process of translation, translators should also pay attention to cultural differences. Due to the differences in different languages and cultural backgrounds, some expressions in petroleum science and technology texts may not have corresponding words or expressions in the target language. In this case, the translator needs to adopt appropriate translation strategies according to the principles of Skopos theory, such as interpretive translation, adding annotations or using alternative expressions, to ensure the accuracy and readability of the translation.

Finally, the translation of petroleum science and technology texts requires constant quality control and revision. After the translation is completed, the translator should carefully check and proofread the translation to ensure its accuracy and completeness. At the same time, professionals with a background in the field of petroleum science and technology can be invited to review and revise the translation to improve its quality and credibility.

To sum up, Skopos theory plays an important guiding role in the translation of petroleum science and technology texts. By following the principles and methods of Skopos theory, translators can convey the original information more accurately and ensure the accuracy and professionalism of the translation. At the same time, the translator can also make proper adjustment and reorganization according to the needs and reading habits of the target language readers, so that the translation is easier to understand and accept. Therefore, in the practice of petroleum science and technology text translation, we should give full play to the guiding role of Skopos theory of translation, and constantly improve the quality and level of translation.

4. Differences in the Order of Sentence Components between English and Chinese

The differences between the arrangement order of complex sentence patterns and modifiers common in petroleum science and technology English texts and Chinese texts, English tends to use post-attributive and participle phrases to modify nouns, while Chinese tends to preposition or transform these modifiers into parallel structures to conform to their respective grammatical rules and expression habits [7].

For instances,

English Text 1 (ET 1): The advanced drilling technology, which has been continuously improved over the years through rigorous research and development, is now capable of extracting oil from deep-sea reservoirs with unprecedented efficiency.

Chinese Text 1 (CT 1): 经过多年严谨的研发与持续改进, 先进的钻井技术现在能够以空前的效率从深海油藏中提取石油。

In an English sentence, the modifier “which has been continuously improved over the years through rigorous research and development” is a non-restrictive

attributive clause. Postmodifies the subject “The advanced drilling technology”. In the Chinese text, the modifier “经过多年严谨的研发与持续改进” is put in front, in line with the Chinese expression habits.

ET 2: The complex refinery process, involving a series of precise chemical reactions and separations, is critical to transforming crude oil into various petroleum products that are essential for modern industrialized societies.

CT 2: 复杂的炼油过程涉及一系列精确的化学反应和分离操作，对于将原油转化为现代工业化社会所必需的多种石油产品至关重要。

In English, “involving a series of precise chemical reactions and separations” is a present participle phrase used as a postmodifier to modify “The complex refinery process.” In Chinese, this modifier is transformed into a juxtaposed phrasal verb “涉及一系列精确的化学反应和分离操作” and placed before the main sentence, forming a different word-order structure.

ET 3: The newly developed enhanced oil recovery techniques, utilizing innovative chemical solvents and advanced pressure control methods, have significantly improved the efficiency of extracting oil from mature fields.

CT 3: 新开发的提高采油技术利用创新的化学溶剂和先进的压力控制方法，显著提高了从成熟油田采油的效率。

“utilizing innovative chemical solvents and advanced pressure control methods” in English sentences is a present participle phrase as a postmodifier. The characteristics of “The newly developed enhanced oil recovery techniques” are explained. In the Chinese text, this modifier is transformed into a verbo-object structure “利用创新的化学溶剂和先进的压力控制方法” and is described before the main sentence.

5. Case Study

5.1. One of the Fixed Structures of Chinese Expression

Non-predicate verbs are frequently used in scientific English, which can be described as a variety of forms. However, the variations are consistent, and translators can process them into some fixed expression structures (sentence patterns) in Chinese. For example:

(Adverbial clause of condition +) (adverbial of way (indicating method) + adverbial of way (indicating position) + verb + adverbial of place + object) gerund construction as subject + predicate verb + (main sentence) object

Example 1:

Original: Similarly, accessing a valve thousands of meters from a wellhead along a highangle wellbore with coiled tubing or slickline presents its own risk-filled challenges.

Translation: 同样，利用连续油管或钢丝沿着一个大斜度井筒去操作一个距井口数千米的控制阀也面临着很大的挑战。

The basic structure of the original text is clear. The gerund phrase “accessing a valve” is the subject, the predicate is “presents” and the object is “challenges”. “thousands of meters from a wellhead” is the adverbial modifier for “valve”;

“along a high-angle wellbore” is an adverbial of manner (indicating orientation); “with coiled tubing or slickline” is another adverbial of manner (indicating method).

The translation arranges the modification elements of the original text according to Chinese logic, and finally forms a clear logical structure of gerund (action) + predicate verb + object. Similarly, “similarly”, as a logical connective word, are similarly located directly at the beginning of the translated sentence according to the Chinese expression habit, and in the final presentation mode: (adverbial of manner (indicating method) + adverbial of manner (indicating position) + infinitive verb + adverbial of place + object) gerund structure is the subject + predicate verb + (main sentence) object.

Example 2:

Original: When wellheads are readily accessible, these sliding sleeves are a relatively simple, low-risk and inexpensive method for manipulating multiple production zones accessed through a single wellbore.

Translation: 在井口易于进入的情况下, 利用滑套从单个井筒进入多个产层实施作业是一种相对简单、低风险、低成本的方法。

The translation shows the logical relationship between “these sliding sleeves” and “manipulating multiple production zones”, that is, the subject (agent) of the two is the same, while the former is the adverbial of mode (verb plus noun form) of the latter (action); accessed through a single wellbore modifies “production zones” in the form of a past participle clause and also as a mode adverbial (preposition plus noun form), With the adverbial clause of condition “When wellheads are readily accessible” in the opening sentence, there are three adverbial clauses throughout the sentence. According to Chinese expression logic or custom, the translator puts the translation of the adverbial clause of condition at the beginning of the translation sentence, and then puts the adverbial clause of way (verb plus noun form) after the adverbial clause of condition and before the adverbial clause of way (preposition plus noun form). The resulting “use ... operation” is a gerund, and as the “be” after the subject of the whole sentence, it forms a theme-conjugation structure.

5.2. Structural Adjustment

The sentence composition information of petroleum science and technology English text is superimposed layer upon layer, which is usually composed of various adverbial clauses. The interpreter needs to clarify the logical relations among them, determine the main body of the sentence, and determine the modifiers (including but not limited to non-predicate verb clauses) to modify the part to avoid mistranslation [8]. In addition, Chinese pays attention to the progressive expression of information, emphasizing the first cause and consequence, that is, the adverbial of cause in advance; it emphasizes the condition before the result, that is, the adverbial preposition of condition and the adverbial preposition of place; emphasizing the preposition of the qualifier, that is, the preposition of the postmodifier; emphasis on raising before sup-

pressing, that is, conceding adverbial preposition.

Example 3:

Original: Dynamically positioned, deepwater support vessels required to act as work platforms from which to perform traditional well interventions in these environs are expensive.

Translation: 要在深水环境中实施常规的修井作业需要有动态定位的深水辅助船作为工作台，但这些船只的成本过高。

“deepwater support vessels” is the subject of the sentence when “Dynamically positioned” is a pre-dynamic attributive composed of adverbs with past participles. “required to act as work platforms” is a postmodifier composed of past participle plus infinitive (in the original), but acts as an object complement in the translation; “from which to perform traditional well interventions” modifies “platforms” and adds more (action) information to them. It is placed at the beginning of the sentence. The translation divides the original text into two parts to make the logic of the original text clearer. The first part: Take the infinitive verb “to carry out routine work over operations” as the subject, and advance the verb “in these environs” (adverbial of place) to change the logical passivity from “be needed” to “need” (as the predicate verb of the main sentence). In the original text, the prefixed intonation at the beginning of the sentence is placed in front of the modified object, and the post-attributive which acts as an object complement is followed in the future. Part 2: But (logical relation) the ship (pronoun) cost (is) too high.

Example 4:

Original: Scenarios are created to generate variances in reservoir performance affecting the timing of events requiring intervention, reservoir monitoring or reservoir management and are often driven by geological uncertainty and reservoir heterogeneity.

Translation: 油藏性能直接影响着修井作业与油藏监管操作(如果采油工程需要)的时机，而由地质不确定性和油藏非均质性驱动的场景模拟，用以描述油藏性能的差异性。

The original text is one of the most difficult sentences in petroleum English because of its vague, layered information and conceptual wording. Translators need to analyze the internal logical relations layer by layer, but only by logical recombination according to Chinese habits can they present a better-quality translation. “affecting the timing of events” modifies the noun phrase “reservoir performance” as the present participle clause; “requiring intervention, reservoir monitoring or reservoir management” modifies the noun “events” in front of another present participle clause; The basic structure of the whole sentence is the main language (Scenarios) plus two Be + past verbs connected by and to form a passive sentence. First, the translation should change the passive voice from the original to active. A noun phrase (reservoir performance, which also serves as the adverbial of “variances” in the original) is selected as the subject of the translation. Subsequently, follow its present participle “affecting” as the object; Then take “intervention, reservoir monitoring or reservoir management” and

add “of” form to translate the limiting relationship; the interpreter is requiring the current sub-word “requiring” to be processed into the bracket form to make the implicit logic in the original text clearly present, which is an ingenious and flexible approach. Then the interpreter begins to deal with the passive sentence pattern, that is, the main sentence of the original text. It should be noted that the interpreter will advance the post-passive sentence connected by “and” and then separate it by commas to translate the former passive sentence. In this way, the logic and information of the original text are clearly conveyed and easy for the reader of the target language to understand quickly.

Example 5:

Original: In contrast, using intelligent completions in a sequential production scheme, which involves opening and closing each zone remotely from the surface, improves production by eliminating both intervention costs and poor production profiles.

Translation: 顺序生产方案包括远程开关各个产层, 而在该方案中使用智能完井技术以节省修井费用, 避免低产剖面, 从而提高产量。

The Chinese language emphasizes the first cause and the consequences, so it is very important to adjust the order of sentence components in the original text. As a logical cohesive word, “In contrast” follows closely the logical information to be connected, and the translated word “while” is just right, which accords with the economy of the language. Then, the attributive clause in the original text is used as the adverbial of condition in the main sentence of the target text to explain the background; then the theme of the statement is connected by “and”. Place the adverbial of place “in a sequential production scheme” before the logical action; place the adverbial of manner connected by “by” in advance, and place the logical result at the end of the sentence.

6. Conclusion

The English and Chinese texts of petroleum science and technology have their own expression habits, and to be familiar with these expression modes is an inevitable requirement to follow the principle of purpose, coherence and fidelity, and is also the key to doing a good job in English translation of petroleum science and technology. However, it is not easy to master them completely in a short time, but it is also not without trace. For example, translators may refer to some fixed “translation formulas”. Some problems cannot be dealt with rigidly, and more flexible handling comes from the accumulation of practice and experience [9].

Conflicts of Interest

The authors declare no conflicts of interest.

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