

LINGUISTIC ANALYSIS OF ENGLISH – VIETNAMESE TRANSLATION PRACTICES IN SCIENTIFIC TEXTS: INSIGHTS FROM SYSTEMIC FUNCTIONAL LINGUISTICS

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Abstract

This research provided a comprehensive linguistic analysis of translation practices applied to two articles on "Advances in Nuclear Fusion and Its Application," employing Halliday's Systemic Functional Linguistics (SFL) as the primary analytical framework. The study meticulously examined the contextual, grammatical, and cohesion aspects of the English source text from The Guardian and its Vietnamese counterpart from VietnamNet. Through comparative analysis, the study identified key linguistic phenomena, translation challenges, and strategic decisions made during the translation process. This research contributes to the field by offering insights into the complexities of translating scientific and technical content between English and Vietnamese, highlighting the role of the SFL in achieving accurate and contextually appropriate translations.

Keywords: cohesion analysis, English – Vietnamese translation, grammatical analysis, nuclear fusion, systemic functional linguistics, translation studies

1. Introduction

In the context of globalization and the rapid development of science and technology, the demand for accurate and contextually appropriate translations of scientific texts has become increasingly critical. Scientific articles, particularly those related to complex and specialized fields such as nuclear fusion, often contain intricate concepts and technical terminology that present significant challenges for translators (House, 2015; Munday, 2016). These challenges are compounded by the structural and typological differences between languages, which require translators to navigate not only linguistic complexities but also cultural nuances (Thompson, 1965; Nguyen & Pham, 2022).

This study employs Halliday's Systemic Functional Linguistics (SFL) framework to analyze and compare two articles on nuclear fusion - one in English and the other in Vietnamese (Halliday & Matthiessen, 2014). The application of SFL provides a comprehensive method for examining the translation process, focusing on how language functions within specific contexts (Butt et al., 2012). By analyzing the grammatical

structures, cohesion, and contextual features of texts, this research aims to uncover the key linguistic challenges faced in translating scientific content from English to Vietnamese (Halliday & Hasan, 1985; Chen et al., forthcoming).

The results of this study reveal significant differences in the way scientific information is presented and structured in English and Vietnamese. These differences include variations in grammatical processes, such as the use of material versus relational processes, and in the deployment of cohesive devices (Hasselgård, 1998; Kim, 2007). The study identifies specific translation challenges, such as the adaptation of passive constructions in English to the more active voice preferred in Vietnamese, and the translation of nominalized expressions, which are prevalent in English scientific discourse but less common in Vietnamese discourse (Hoang, 2021; Espindola, 2016).

Moreover, the study highlights strategic decisions made during the translation process to address these challenges, such as the rephrasing of nominalizations to enhance clarity and the cultural adaptation of content to make it more accessible to Vietnamese readers (Laviosa et al., 2017; Károly, 2017). The insights gained from this research contribute to the broader field of translation studies by demonstrating how the SFL can be used to improve translation practices, ensuring that translated texts are both accurate and contextually appropriate (Ma & Wang, 2016; Calzada Pérez, 2007).

The findings underscore the importance of a deep understanding of both the source and target languages in scientific translation. They also suggest that ongoing training and professional development are essential for translators working in specialized fields, as scientific and technical content becomes increasingly globalized (Gumul, 2011; Catford, 1965). By applying advanced linguistic theories such as the SFL, translators can achieve higher quality outcomes, effectively communicating complex scientific ideas across linguistic and cultural boundaries (Hatim & Mason, 1990; Hoang, 2021).

2. Literature Review

Systemic functional linguistics, developed by M.A.K. Halliday, provides a comprehensive approach to analysing language as a social semiotic system. SFL focuses on how language is used in different contexts and how linguistic choices are influenced by the functions they serve (Halliday & Matthiessen, 2014). In translation studies, the SFL has been widely applied to explore how meanings are constructed and conveyed across different languages, particularly in specialized domains such as science and technology (Butt et al., 2012).

Previous studies highlighted the challenges of translating scientific texts due to differences in linguistic structures, terminology, and cultural contexts (House, 2015; Munday, 2016). These challenges were particularly pronounced when translations were made between languages with significant structural and typological differences, such as English and Vietnamese. Vietnamese, a member of the Austroasiatic language family, differed considerably from English, an Indo-European language, in terms of syntax, morphology, and phonology (Thompson, 1965). This research builds on these foundational studies by applying SFL to a detailed analysis of translation practices in the context of nuclear fusion, aiming to uncover specific linguistic challenges and propose effective translation strategies.

The author utilized popular sources such as The Guardian and VietnamNet to connect scientific or academic findings with practical examples and to reach a broader audience. These mainstream outlets have a general readership, making complex issues more accessible. The reference to popular media is intended to highlight the societal relevance of the research and ensure that information extends beyond academic circles. Moreover, these sources are often updated with current events, helping to provide contextual background for the research.

3. Methods

This study utilizes a combination of qualitative and quantitative methods to analyze linguistic features and translation practices. Halliday's Systemic Functional Linguistics theory is applied as the framework for the linguistic analysis, focusing on contextual, grammatical, and cohesive aspects of the selected texts. For the translation process, one English article and one Vietnamese article were translated in both directions, identifying key challenges and evaluating strategies to enhance translation accuracy and effectiveness. Data collected from this analysis serves to inform conclusions and recommendations for improving translation methodologies in academic and professional.

4. Results

4.1. Selection of Texts

The study focused on two articles related to nuclear fusion, chosen for their relevance to the topic and their potential to illustrate the linguistic and translation challenges inherent in rendering scientific content across languages. The English article titled "Fusion power might be 30 years away but we will reap its benefits well before" was published by *The Guardian*, a reputable source known for its coverage of scientific advancements. The Vietnamese article, "Lò phản ứng nhiệt hạch: Hiện thực hoá giấc mơ năng lượng sạch vô tận," was published by *VietnamNet*, a leading Vietnamese news outlet that regularly features scientific and technological content. These articles were carefully selected to ensure that they both addressed similar scientific themes, allowing for a more accurate and meaningful comparison of linguistic and translation strategies.

4.2. Contextual Analysis

The contextual analysis component of this study, grounded in Halliday's Systemic Functional Linguistics (SFL), involves examining the context of the situation in which each article was produced. This analysis is structured around three key aspects: field, tenor, and mode.

- Field refers to what is happening in the text—the subject matter and content. In both articles, the field revolves around advancements in nuclear fusion technology, including its potential benefits and the challenges associated with its development. However, the specific focus and presentation of information in each article vary, and are influenced by the intended audience and the cultural context of the publication.
- The tenor examines the relationship between the participants in the communication, primarily the relationship between the writer and the reader. Both articles adopt a formal and informative tenor, but there are nuanced differences. The English article, targeting a global audience with a general interest in science, adopts a slightly more speculative tone,

discussing future possibilities. The Vietnamese article, while also formal, tends to emphasize descriptive and narrative elements, reflecting a different cultural approach to scientific reporting.

- The mode relates to how the language is used—the role it plays in the communication and organization of the text. Both articles are written in an expository mode, aiming to inform and educate the reader. However, the mode of the English article is more argumentative, using logical connectors and detailed explanations to build a case for the future benefits of nuclear fusion. The Vietnamese article, on the other hand, integrates more narrative techniques, which might reflect a cultural preference for storytelling even in scientific discourse.

This contextual analysis is crucial because it provides the foundation for understanding the linguistic choices made in each text and how these choices affect the translation process. The translator must navigate these contextual differences to produce a translation that is not only linguistically accurate but also culturally and contextually appropriate for the target audience.

4.3. Grammatical analysis

Grammatical analysis within the SFL framework is centered on the transitivity system, which involves the representation of processes, participants, and circumstances within a clause. This analysis is particularly important for scientific texts, where the precise depiction of actions, events, and relationships is essential.

- Material processes are used extensively in English articles to describe actions related to the development and application of nuclear fusion technology. Verbs such as "install," "develop," and "create" highlight the dynamic and ongoing nature of scientific progress. These processes are often accompanied by circumstantial elements that specify details such as time, place, and manner, which are critical for the clarity and precision of scientific exposition.

- In contrast, the Vietnamese article makes more frequent use of relational processes (e.g., "là," "trở nên," "cung cấp"), which are employed to describe states of being or relationships between entities. This reflects a tendency in Vietnamese scientific discourse to emphasize the description of entities and their attributes rather than focusing solely on actions. The grammatical structure of Vietnamese, with its less rigid syntax than English does, allows for greater flexibility in sentence construction, which can lead to challenges in maintaining the same level of specificity and clarity when translating material processes from English.

Another key aspect of grammatical analysis is the use of nominalization in English articles. Scientific texts in English often condense complex processes into noun phrases (e.g., "the development of fusion technology"), which contributes to the density and formality of the text. However, translating these nominalized structures into Vietnamese can be challenging, as the language tends to prefer more explicit verbal expressions. The translator must therefore decide whether to retain the nominalized structure or to expand it into a full clause, balancing clarity with conciseness.

This detailed grammatical analysis helps identify specific linguistic features that need careful attention during translation. Understanding these features allows the translator to make informed decisions about how to adapt the text to the target language while preserving the original meaning and intent.

4.4. Cohesion analysis

Cohesion analysis examines how the various linguistic elements within a text are interconnected, contributing to its overall coherence. Cohesion is crucial in scientific texts, where maintaining logical flow and clarity is essential for effective communication.

- In English, cohesion is achieved through a dense network of references, conjunctions, and lexical repetition. For example, personal references such as "it," "they," and "we" are used to maintain continuity across sentences and paragraphs, linking different parts of the text to create a unified argument. Conjunctions such as "however," "therefore," and "but" are strategically placed to guide the reader through complex reasoning, ensuring that the text is logically structured and easy to follow.
- While cohesive, the Vietnamese article employs different strategies. It relies more on lexical repetition and parallel structures to achieve cohesion, rather than on conjunctions and references. This stylistic difference reflects a broader cultural preference in Vietnamese writing for simplicity and repetition over the use of explicit markers of cohesion. However, this can pose a challenge in translation, as the logical connections in the English text may need to be conveyed more implicitly in Vietnamese without losing the clarity and coherence of the original argument.

The cohesion analysis provides insights into how each language achieves textual unity and how these methods can differ significantly. By understanding these differences, the translator can better navigate the challenges of maintaining the logical flow of the original text while adapting it to the stylistic norms of the target language.

The detailed analysis of the data and methods presented in this section highlights the complexity of translating scientific texts between English and Vietnamese. The selection of texts, contextual analysis, grammatical analysis, and cohesion analysis all contribute to a deeper understanding of the linguistic challenges faced in translation. By employing the SFL framework, this study not only identifies these challenges but also provides a structured approach to address them, ensuring that the translated text remains faithful to the original while being appropriate and accessible to the target audience.

5. Discussion

5.1. Linguistic Challenges in Translation

The translation of scientific texts from English to Vietnamese presented several linguistic challenges, particularly in terms of grammatical structure, cohesion, and the use of specialized terminology. The grammatical differences between English and Vietnamese, particularly in the use of tenses, voices, and modalities, required careful adaptation to ensure that the translated text remained both accurate and natural. For instance, the English use of passive voice to emphasize processes and results often needed to be restructured into active voice in Vietnamese, where passive constructions were less common and could lead to ambiguity (Nguyen et al, 2022).

Moreover, the translation of cohesive devices, such as conjunctions and references, requires careful attention to maintain the logical structure of the text. The English article's use of explicit conjunctions to link ideas and guide the reader through the argument was less common in Vietnamese, which often relied on implicit connections and parallelism. Translators therefore had to find ways to convey the same logical flow without overburdening the text with explicit markers, which could disrupt the natural rhythm of Vietnamese prose.

5.2. Strategic Decisions in Translation

To address these challenges, several strategic decisions were made during the translation process. First, the translator prioritized clarity and readability in the Vietnamese translation, even if this required rephrasing or restructuring certain passages. For example, nominalized expressions in English were often expanded into full clauses in Vietnamese to ensure that the intended meaning was clear.

Second, the translator made use of cultural adaptation to make the scientific content more accessible to Vietnamese readers. This involved not only accurately translating the technical terms but also providing additional context or explanations where necessary to bridge the gap between the original and target audiences. This strategy was particularly important in the field of science and technology, where the level of familiarity with certain concepts might vary significantly across different linguistic and cultural groups.

5.3. Insights and Implications for Translation Practice

The insights gained from this study underscore the importance of a deep understanding of both the source and target languages in scientific translation. The translators needed to be equipped with not only linguistic expertise but also a solid grounding in the subject matter to ensure that the translation was both accurate and contextually appropriate. The use of the SFL as an analytical framework provides valuable tools for identifying linguistic challenges and developing effective translation strategies.

Furthermore, this study highlighted the need for ongoing training and professional development for translators working in specialized fields. As scientific and technical content becomes increasingly globalized, the demand for high-quality translations continues to grow. Translators therefore had to be prepared to engage with both the linguistic and conceptual complexities of the texts they worked with, applying advanced linguistic theories such as the SFL to achieve the best possible outcomes.

This research provides a detailed linguistic analysis of the translation process for two scientific articles on nuclear fusion, using Halliday's Systemic Functional Linguistics as the primary framework. The study identified significant differences in the grammatical and cohesive features of English and Vietnamese texts, highlighting the challenges these differences posed for translators. Through careful analysis and strategic decision-making, the translation process was able to address these challenges, resulting in a translation that was both accurate and contextually appropriate.

The findings of this research contributed to the broader field of translation studies by demonstrating the value of the SFL as a tool for analysing and improving translation practices. The insights gained from this study could be applied to other areas of scientific and technical translation, helping to ensure that complex content is effectively communicated across linguistic and cultural boundaries.

6. Recommendations

On the basis of the findings of this study, several recommendations could be made for future translation practices and research. First, translators working in specialized fields should receive comprehensive training in linguistic theories such as the SFL, which could provide valuable insights on the structure and function of the texts they the translate. Second, translation practices should be continuously updated and refined to reflect the latest developments in both language and subject matter expertise.

Finally, further research should be conducted into the application of the SFL in other areas of translation, particularly in fields where linguistic and cultural differences are likely to pose significant challenges. By expanding our understanding of how language functions in different contexts, we could continue to improve the quality and effectiveness of translations across a wide range of disciplines.

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