

## A Comparative Study of the Translation of Cohesion in English-Chinese Business Texts between Human Translators and ChatGPT

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### ABSTRACT

This study examines how cohesion is rendered in English-Chinese translation by human translators and ChatGPT, with a focus on business texts. The analysis of cohesion draws on Halliday and Hasan's (1976) model of cohesive devices, while the classification of translation methods uses Vinay and Darbelnet's (1995) taxonomy. A mixed-methods approach is adopted, combining qualitative exploration of the translation strategies with quantitative analysis of the frequency and similarity of translation methods for cohesive devices between human and ChatGPT translation. A self-compiled parallel corpus comprising eight English business annual report passages, along with their human translations and ChatGPT outputs, is employed, totalling 46,423 words. The results reveal that human and ChatGPT translations similarly employ six main translation methods, namely literal translation, borrowing, transposition, modulation, equivalence, and omission. Direct strategies (literal translation and borrowing) dominate, followed by omission, while oblique strategies (transposition, modulation, and equivalence) are least frequent. The similarity rate in the treatment of cohesive devices between the two versions exceeds 82%, suggesting a high degree of convergence. Nevertheless, differences also emerge. ChatGPT translation relies more on omission and direct strategies, whereas human translation demonstrates slightly stronger orientation toward the target language and greater use of oblique strategies. Translation errors are also identified in ChatGPT outputs, emphasizing the need for post-editing. This research contributes to translation studies by providing a systematic framework for cohesion analysis, offering corpus-based evidence on similarities and differences between human and ChatGPT translations.

**Contribution/Originality:** This study contributes an integrated framework linking cohesion and translation methods, a mixed-methods corpus-based approach, and empirical evidence on English-Chinese business translation. It reveals high

convergence yet key differences between human and ChatGPT translation, highlights AI limitations in cohesion handling, and offers implications for translation theory, pedagogy, and AI-assisted practice.

## 1. Introduction

Globalization has led to a substantial increase in the need for translation services (House, 2015), particularly in business sectors (Biel & Sosoni, 2017; Chiper, 2002). Business translation requires not only precision but also efficiency. One important feature of business texts is cohesion, which differs in frequency and type from other specialized texts (Morrow, 1989). Cohesion is crucial for ensuring clarity and communicative effectiveness, as well-structured and logically connected ideas allow readers and listeners to follow explanations, updates, and presentations with ease (Romadhon et al., 2025). However, challenges in business translation often arise from cohesion-related issues, such as inaccurate rendering of synonyms and collocations (Ameen & Sherwani, 2023), inconsistent translation of financial and business terminology (Al Obaidani, 2018), and occasional loss of cohesive links (Mohammedameen & Sherwani, 2023). These challenges underscore the need for further investigation into cohesion in the translation of business texts.

To address time constraints (Firat et al., 2024; Taivalkoski-Shilov & Koponen, 2023) and intense competition in business translation (Firat et al., 2024), machine translation tools have been increasingly adopted in business contexts (Maruf et al., 2021; Shuke, 2025). AI translation offers several advantages, including cost reduction (Maruf et al., 2021), rapid language processing (Almasharqa & Qadha, 2025; Shuke, 2025), improved accessibility (Almasharqa & Qadha, 2025), and support for a wide variety of languages (Maruf et al., 2021; Shuke, 2025). Among these tools, ChatGPT has emerged as one of the most prominent AI translation systems. It can analyze source texts (Siu, 2023), improve fluency in the output (Castilho et al., 2023), produce context-aware translations (Hendy et al., 2023), and enhance translation performance even for linguistically distant languages (Jiao et al., 2023). Despite growing interest in AI translation, cohesion in ChatGPT's translation of business texts remains insufficiently investigated.

Against this background, the present study conducts a comparative investigation of how human translators and ChatGPT render cohesion in English-Chinese business translation. It focuses on the translation methods employed in the treatment of cohesion and examines both the similarities and differences between human and ChatGPT translations. Given that subtypes of business texts, including reports, letters, and telexes, exhibit distinct textual features (Dudley-Evans, 1989), the present study concentrates on business annual reports. It aims to (1) explore the translation methods used by human translators and ChatGPT in handling cohesion in the English-Chinese translation of business annual reports, and (2) investigate the similarities and differences between human translators and ChatGPT in their use of cohesive devices in the English-Chinese translation of business annual reports. Guided by these objectives, the study addresses the following research questions: (1) What translation methods are used by human translators and ChatGPT in handling cohesion in the English-Chinese translation of business annual reports? (2) How do the methods for translating cohesive devices differ between human translators and ChatGPT in English-Chinese business annual reports?

## 2. Literature Review

### 2.1. Cohesion Translation

Research on cohesion in translation has evolved significantly, characterized by a diversification of analytical methods, a shift in scope from sentences to documents, and a growing focus on comparisons between human and machine translation. Methodologically, studies have employed manual, semi-automatic, and automated analyses to examine cohesion. Studies relying on manual approaches describe the phenomenon of cohesion in translation (e.g., Moindjie, 2015, 2023, 2024; Orang'i, 2021; Pápai, 2004; Tang & Moindjie, 2024), explore cohesive translation shifts (e.g., Károly, 2010, 2014; Orang'i, 2022a, 2022b; Orang'i & Ndlovu, 2021; Tang & Moindjie, 2025), and establish translation norms of cohesive devices (e.g., Moindjie, 2019, 2022). Semi-automatic procedures supporting manual analysis have been adopted to examine terminology variation (e.g., Kerremans, 2017) and detect divergences in syntactic patterns (e.g., Kunilovskaya & Kutuzov, 2017). Automated approaches have been used to identify specific cohesive items to investigate phenomena such as translation explicitation (e.g., Alasmri & Kruger, 2018; Chen, 2004; Xiao & Dai, 2014), structural and semantic differences between source and target languages (e.g., Kunz & Lapshinova-Koltunski, 2014), and features of translationese (e.g., Lapshinova-Koltunski, 2017).

The focus on cohesion in translation has progressed from sentence-level to document-level research. Some early studies conduct contrastive analyses of cohesion between language pairs using samples of isolated sentences (e.g., Wu, 2014). However, as noted by Läubli et al. (2020), analysis focused solely on the sentence level is inadequate for identifying issues of textual cohesion. Numerous machine translation systems have been compared with human translators with regard to cohesion in translation across different language pairs. While some studies examine multiple machine translation systems concurrently, such as the four in Lapshinova-Koltunski's (2017) and the five in Sipayung's (2021) research, Google Neural Machine Translation has received the most scholarly attention in comparisons with human translation, as seen in Chinese-English (Qin et al., 2019), Arabic-English (Tohamy, 2021), and English-Indonesian (Putra & Jupply, 2021) research. In contrast, rigorous comparative research on the translation capabilities of large language models such as ChatGPT remains notably limited. Although initial research on ChatGPT has emerged (Tang & Moindjie, 2024, 2025), its scope is limited to a single type of cohesive device, highlighting the need for more comprehensive investigation across all categories. Therefore, future research should aim to conduct a more comprehensive and systematic analysis of ChatGPT's ability to handle the full spectrum of cohesive devices across diverse language pairs and text types.

### 2.2. Theoretical Framework

This study is grounded in an integrated theoretical framework. It combines Halliday and Hasan's (1976) model of cohesion, which provides a descriptive apparatus for analyzing textual texture, with Vinay and Darbelnet's (1995) taxonomy of translation methods, supplemented by omission as an additional method, thereby offering an explanatory lens for understanding the strategic choices that shape that texture. One of the most influential models of cohesion is that proposed by Halliday and Hasan in their 1976 work *Cohesion in English* (Amoakohene et al., 2022; Baker, 1992; Károly, 2017; Károly et al., 2013; Vu, 2023). They argue that cohesion concerns how a text is constructed as a semantic structure and propose five cohesive devices as lexico-grammatical resources

that connect elements within a text and establish semantic relationships: reference, substitution, ellipsis, conjunction, and lexical cohesion.

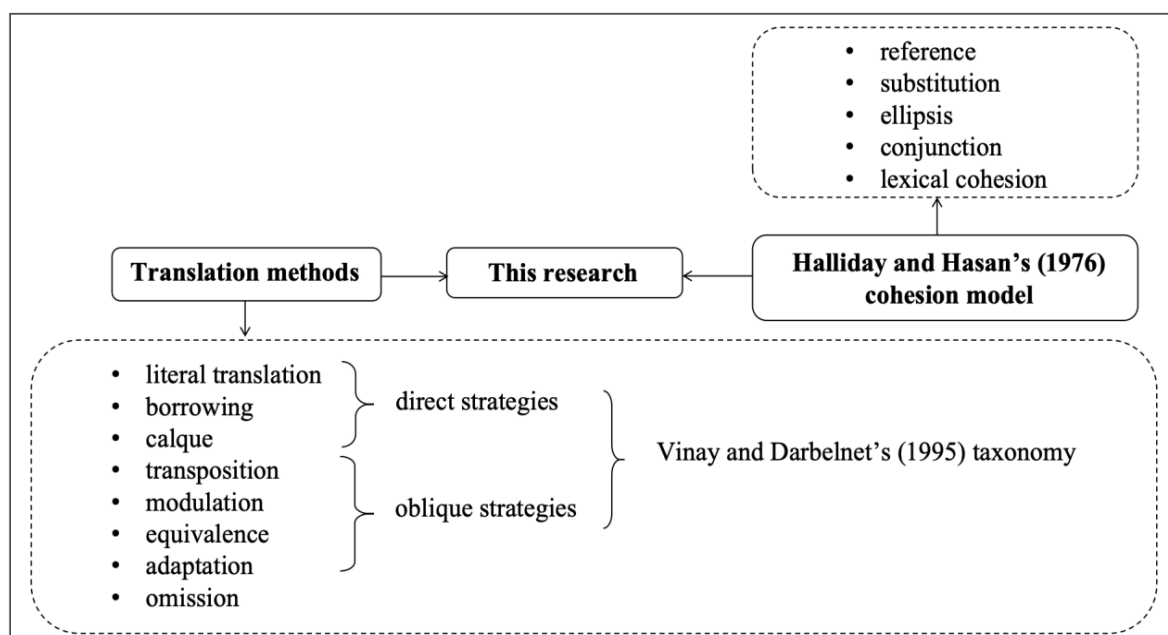
First, reference refers to words representing a participant or circumstantial element introduced in one part of the text can serve as a reference point for subsequent information, which include personals, demonstratives, and comparatives (Halliday & Hasan, 1976). Personals encompass personal pronouns, possessive determiners, and possessive pronouns; demonstratives refer to words denoting nearness or remoteness; comparatives involve nouns and adverbial phrases, facilitating comparisons on aspects such as identity, resemblance, and difference, as well as particular characteristics and amounts (Halliday & Hasan, 1976). Second, substitution denotes words as placeholding elements that are inserted to indicate an unfilled structure within the text (Halliday & Hasan, 1976). Substitution consists of clausal substitution, verbal substitution, and nominal substitution, which means substituting the clause, the verbal group, and the nominal group respectively (Halliday & Hasan, 1976). Third, ellipsis signifies a clause, part of a clause, or a section that can be presupposed later in the text through deliberate omission, leaving unsaid what is required to complete the meaning (Halliday & Hasan, 1976). Ellipsis contains clausal ellipsis, verbal ellipsis, and nominal ellipsis, which means omitting the clause, the verbal group, and the nominal group respectively (Halliday & Hasan, 1976). Fourth, conjunction denotes words representing one or more specific semantic relations through which a clause or clause complex, or a longer section of text, can be connected to what comes next, which are shown by elaboration, extension, and enhancement (Halliday & Hasan, 1976). Elaboration embodies apposition and clarification; extension represents addition, adversative, and variation; enhancement makes cohesion in spatio-temporal, manner, causal-conditional, and matter (Halliday & Hasan, 1976). Fifth, lexical cohesion indicates the choice of words that helps establish continuity within a text, which incorporate repetition, synonymy, and collocation (Halliday & Hasan, 1976). Repetition pertains to the reoccurrence of identical lexical units, including various morphological shapes of a lexical item; synonymy falls under a broader category covering relationships of lexical similarity, contrast, part-whole inclusion, and subordination, specifically including synonymy, antonymy, meronymy, and hyponymy; collocation highlights the tendency for specific lexical items to frequently appear together, encompassing not just independent words but also set phrases and clichés (Halliday & Hasan, 1976). Because this theory provides a comprehensive explanation of cohesive devices and the specific forms of their various sub-types (Károly et al., 2013), it can be utilized in analyzing the translation of cohesive devices.

To account for translation decisions regarding cohesive features in target texts, a model of translation methods is required. While several theorists have proposed such models, such as Nida's (1964) twofold methods (technical and organizational methods) or Kade's tripartite division (substitution, interpretation, and paraphrase) (Wilss, 1982), their frameworks are unfeasible or overlapping for discourse analysis. Consequently, this study adopts the model proposed by Vinay and Darbelnet (1995). Their taxonomy of translation methods can be considered one of the most systematic classifications of translation methods (Moindjie, 2006). A good explanation of the translation method is provided in understanding the process involved when shifting between languages (Gambier, 2010). They dismiss the notion of translating single words, emphasizing instead the translation of ideas and emotions across different semantic contexts, rather than focusing on individual lexemes (Waliński, 2015).

Vinay and Darbelnet (1995) distinguish two approaches: direct and oblique strategies. Direct and oblique translation echo the traditional distinction between literal and free translation (Munday et al., 2022). Direct strategies primarily rely on adherence to the literal meaning and include three methods: literal translation, borrowing, and calque. Oblique strategies are adopted when literalness is inappropriate and involve four methods: transposition, modulation, equivalence, and adaptation. Specifically, literal translation involves directly rendering a source language text into a target text that is both grammatically correct and idiomatically natural, with the translator following the linguistic rules of the target language; borrowing refers to the use of foreign terms in a translation to convey the cultural essence of the source language; calque refers to the adoption of the structure of an expression from another language by translating each of its components literally; transposition is the process of substituting one grammatical category for another while preserving the original meaning of the message; modulation involves altering the form of a message by shifting the perspective; equivalence refers to the use of entirely different stylistic and structural approaches in translation to achieve the same overall effect or meaning as the original text; adaptation occurs when the situation described in the source language has no direct equivalent in the target culture, requiring the translator to construct a comparable situation that conveys the same meaning (Vinay & Darbelnet, 1995).

In addition to the seven translation methods proposed by Vinay and Darbelnet (1995), omission can be seen as a special translation method of cohesion. According to Dimitriu (2004), a translation may exclude certain parts of the source text, indicating they were omitted by the translators. Therefore, omission serves as the eighth translation method in the analysis of cohesive devices in this study. The combination of cohesive devices and translation methods forms the core of this study's analytical approach, as shown in Figure 1. Halliday and Hasan's (1976) framework is used to identify cohesive devices in source and target texts, while Vinay and Darbelnet's (1995) taxonomy, with omission incorporated as an additional method, is applied to characterize the choices in human and machine translation, thus diagnosing the similarities and differences in cohesion between them.

Figure 1: Theoretical Framework of the Study



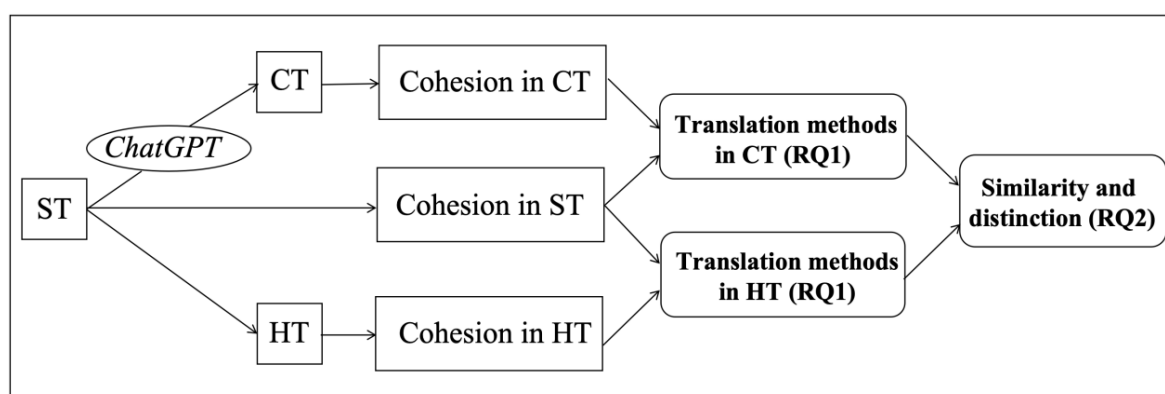
### 3. Research Methods

#### 3.1. Research Design

This study is an empirical investigation within descriptive translation studies, aiming to examine how human translators and ChatGPT translate cohesion in English-Chinese business annual reports, particularly with regard to the translation methods. As mixed-methods research leads to a fuller understanding of the subject under investigation (Creswell & Clark, 2018; Leavy, 2017), it was therefore adopted. Qualitative research focuses on explaining translation methods, whereas quantitative research is concerned with the frequency and proportions of cohesion translation methods and their similarities and differences between human and ChatGPT translations.

Data were collected from the corpus compiled by the first author, which comprises Chinese source texts (ST) and English target texts produced by human translators (HT) and ChatGPT (CT). Cohesive devices (reference, substitution, ellipsis, conjunction, and lexical cohesion) in ST, HT, and CT were identified. Subsequently, the translation methods of cohesion (literal translation, borrowing, calque, transposition, modulation, equivalence, adaptation, and omission) were categorized in HT and CT. Purposive sampling was employed, as this method is particularly well-suited for case study research (Saldanha & O' Brien, 2014) and is considered highly effective for purposively gathering information to answer the research questions (McGregor, 2018). Representative examples that best demonstrate the translation methods of cohesive devices were selected for detailed discussion. The conceptual framework is presented in Figure 2.

Figure 2: Conceptual Framework of the Study



#### 3.2. Corpus and Prompt Engineering

The corpus used in this study is a self-compiled, small parallel corpus of specialized texts. Small, specialized corpora, typically ranging from 20,000 to 200,000 words, enable closer attention to specific registers and genres (Flowerdew, 2002). They reveal patterns of language use within specific contexts rather than in the language as a whole (Koester, 2010; Pan, 2014). Specifically, the corpus comprises a total of 46,423 words, including 9,610 words in the ST, 18,830 words in the HT, and 17,983 words in the CT, as detailed in Table 1. The ST encompasses eight complete passages from four business annual reports, randomly selected, with lengths ranging from 500 to 3,600 words and publication dates spanning 2021 to 2023. The HT was produced by the same institutions that published the ST. URLs for the business annual reports comprising the ST and HT

are provided in Tables 2 and 3, respectively. The CT was generated by ChatGPT (version GPT-4o) by the first author on January 8, 2025.

Regarding the translation of CT, the author prefaced each passage of the ST in the ChatGPT chat window with the prompt, 'Translate the business text into Chinese:', aiming to remind ChatGPT of the specialized nature of the business text. When ChatGPT stops translating due to the text being too long, the researcher continued with the prompt 'Continue translating the rest of the business text into Chinese'. This approach represents a zero-shot prompting strategy, which, by providing no examples or additional constraints, allows the model's default translation behavior to be observed. Generative AI models using zero-shot prompting are capable of producing high-quality translations (Yazidus et al., 2025). Since ChatGPT may generate different outputs across multiple attempts, the first translation result was adopted as the CT to minimize researcher intervention. This choice captures the model's initial unaltered output under uniform conditions, rather than a retrospectively optimized result.

Table 1: Corpus of the Study

| ST                                                                                                                                                                                                                  | HT                                                                                                                                                                         | CT                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| the passages from <i>IMF Annual Report 2023</i> :<br>(1) Public Debt;<br>(2) Economic Surveillance                                                                                                                  | the passages from the Chinese version of <i>IMF Annual Report 2023</i> (IMF2023 年年报):<br>(1) '公共债务';<br>(2) '经济监督'                                                         | the Chinese version of ST translated by ChatGPT produced by the first author on January 8, 2025 with ChatGPT-4o |
| the passages from World Bank's <i>Annual Report 2023</i> :<br>(1) Promoting Sustainable Finance and Capital Markets;<br>(2) Enhancing Effectiveness and Sustainability in Our Operations                            | the passages from the Chinese version of World Bank's <i>Annual Report 2023</i> (2023 年度报告):<br>(1) '推动可持续金融和资本市场发展';<br>(2) '提高业务的有效性和可持续性'                               |                                                                                                                 |
| the passage from <i>Asian Development Bank Annual Report 2022</i> :<br>(1) Organizational Effectiveness                                                                                                             | the passage from the Chinese version of <i>Asian Development Bank Annual Report 2022</i> (亚洲开发银行 2022 年度报告):<br>(1) '组织机构有效性'                                              |                                                                                                                 |
| the passages from World Economic Forum's <i>Annual Report 2021-2022</i> :<br>(1) Technology and Digital Innovation;<br>(2) World Economic Forum Beijing Representative Office;<br>(3) Forum of Young Global Leaders | the passages from the Chinese version of World Economic Forum's <i>Annual Report 2021-2022</i> (2021-2022 年度报告):<br>(1) '技术和数字创新';<br>(2) '世界经济论坛北京代表处';<br>(3) '全球青年领袖论坛' |                                                                                                                 |

Table 2: URL Access of Business Annual Reports Comprising ST

| Business annual reports comprising ST                 | URL Access                                                                                                                                                                                                      |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>IMF Annual Report 2023</i>                         | <a href="https://cdn.sanity.io/files/un6gmxxl/production/5e4df7c81e6b37f55db8734b200a94f85bc4670d.pdf">https://cdn.sanity.io/files/un6gmxxl/production/5e4df7c81e6b37f55db8734b200a94f85bc4670d.pdf</a>         |
| <i>World Bank's Annual Report 2023</i>                | <a href="https://openknowledge.worldbank.org/bitstreams/69332452-bfbb-4b09-bd60-f4932a43c89a/download">https://openknowledge.worldbank.org/bitstreams/69332452-bfbb-4b09-bd60-f4932a43c89a/download</a>         |
| <i>Asian Development Bank Annual Report 2022</i>      | <a href="https://www.adb.org/sites/default/files/institutional-document/872636/adb-annual-report-2022.pdf">https://www.adb.org/sites/default/files/institutional-document/872636/adb-annual-report-2022.pdf</a> |
| <i>World Economic Forum's Annual Report 2021-2022</i> | <a href="https://www3.weforum.org/docs/WEF_Annual_Report_2021_22.pdf">https://www3.weforum.org/docs/WEF_Annual_Report_2021_22.pdf</a>                                                                           |

Table 3: URL Access of Business Annual Reports Comprising HT

| Business annual reports comprising HT | URL Access                                                                                                                                                                                                            |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IMF2023 年年报                           | <a href="https://cdn.sanity.io/files/un6gmxxl/production/c5967145321f228e1bb6eb16f3faa9bd86f9616e.pdf">https://cdn.sanity.io/files/un6gmxxl/production/c5967145321f228e1bb6eb16f3faa9bd86f9616e.pdf</a>               |
| 2023 年度报告                             | <a href="https://openknowledge.worldbank.org/bitstreams/c6c55f9c-dd97-4323-a023-7e1e619667c6/download">https://openknowledge.worldbank.org/bitstreams/c6c55f9c-dd97-4323-a023-7e1e619667c6/download</a>               |
| 亚洲开发银行 2022 年度报告                      | <a href="https://www.adb.org/sites/default/files/institutional-document/872636/adb-annual-report-2022-zh.pdf">https://www.adb.org/sites/default/files/institutional-document/872636/adb-annual-report-2022-zh.pdf</a> |
| 2021-2022 年度报告                        | <a href="https://www3.weforum.org/docs/WEF_Annual_Report_2021_22_CN.pdf">https://www3.weforum.org/docs/WEF_Annual_Report_2021_22_CN.pdf</a>                                                                           |

### 3.3. Procedures of Data Collection

Data collection proceeded in six stages. First, cohesive devices in the ST were identified, marked, and counted. Second, through comparative reading of the ST and HT, cohesive devices in the HT were identified, marked, and counted. Third, through comparative reading of the ST and CT, cohesive devices in the CT were identified, marked, and counted. Fourth, translation methods for cohesive devices in the HT were identified, marked, and counted via comparison with the ST. Fifth, translation methods for cohesive devices in the CT were identified, marked, and counted via comparison with the ST. Finally, the translation methods in HT and CT were compared to quantify their similarities and differences. This six-stage procedure ensured a systematic identification and analysis of cohesive devices and their translation methods across human and ChatGPT translations.

### 3.4. Validity and Reliability

Ensuring data reliability and validity is fundamental to research (McGregor, 2018). To minimize subjectivity and enhance the authenticity and robustness of the findings, inter-coder agreement and consultation with expert judges were conducted. Prior to the commencement of the study, the two authors reached a consensus on the research methods, data collection procedures, and operational definitions of the data. The first author undertook corpus compilation, the identification of cohesive devices in the ST, and the identification and categorization of translation methods in the HT and CT, while



the second author checked all the data. In line with common practice in qualitative research, an inter-coder consistency rate exceeding 80% was adopted as the benchmark for acceptable agreement (Carletta, 1996, pp. 249-254). In cases of disagreement between the two researchers, expert consultation was used to address and resolve uncertain data. Expert judges contributed to the verification of reliability and the assessment of content validity (Lunenburg & Irby, 2008; McGregor, 2018). This study engaged three expert reviewers, whose primary task was to assist in the identification of cohesive devices and the classification of translation methods. All final coding decisions were reached through consensus among the three experts and the two researchers.

## 4. Results and Discussion

### 4.1. Types of Translation Methods of Cohesion

Six translation methods were identified in both HT and CT, namely literal translation, borrowing, transposition, modulation, equivalence, and omission. Tables 4 to 9 show examples of these translation methods in the corpus.

Table 4: Example 1: Literal Translation

| Text                             | ST                                                                                                                                                                           | HT                                                | CT                                                 |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------|
| Content                          | Collectively, <b>this</b> course's participants have direct influence over 70,000 employees, and <b>their</b> organizations interact with more than 17 million constituents. | 总体而言，本课程的参与者直接影响 70,000 多名员工，其所在组织的影响超过 1,700 万人。 | 总体而言，该课程参与者直接影响着 70,000 名员工，其所在组织与超过 1,700 万名群体互动。 |
| Cohesion and translation methods | <b>this</b> reference<br><b>their</b> reference                                                                                                                              | 本 literal translation<br>其 literal translation    | 该 literal translation<br>其 literal translation     |

The first example illustrates literal translation. Literal translation of cohesion refers to translating cohesive elements in a way that preserves the original structure and meaning as closely as possible. In the ST, the bolded items 'this' and 'their' are instances of demonstrative reference and personal reference, respectively. Both HT and CT apply literal translation by using their equivalent Chinese pronouns. The similarity in translation methods results from the translators' similar understanding of the consistency between the Chinese and English grammatical systems. Across the corpus, literal translation is widely employed when letters, words, or phrases function as cohesive items.

Table 5: Example 2: Borrowing

| Text    | ST                                                                                                                                                                                        | HT                                                                                   | CT                                                                       |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Content | The Forum's core <b>IT</b> infrastructure continued to be consolidated using leading cloud services in line with the cloud-first strategy. In parallel, <b>IT</b> security was reinforced | 按照云优先的发展战略，论坛使用顶级的云服务，进一步强化了核心的 <b>信息技术</b> 基础设施。与此同时，论坛按照零信任原则加强了 <b>信息技术</b> 系统的安全 | 根据“云优先”战略，论坛的核心 <b>IT</b> 基础设施继续通过领先的云服务整合。同时， <b>IT</b> 安全按照零信任原则得到了加强。 |

|                                  |                                     |       |                     |           |           |  |
|----------------------------------|-------------------------------------|-------|---------------------|-----------|-----------|--|
|                                  | according to zero trust principles. | 性。    |                     |           |           |  |
| Cohesion and translation methods | <b>IT</b> lexical cohesion          | 信息 技术 | literal translation | <b>IT</b> | borrowing |  |
|                                  | <b>IT</b>                           | 信息 技术 | literal translation | <b>IT</b> | borrowing |  |

The second example demonstrates borrowing. Borrowing of cohesion refers to the direct transfer of cohesive items in translation. In the ST, the two proper nouns 'IT' form lexical cohesion through repetition. HT employs literal translation by rendering the full form, whereas CT uses borrowing by retaining the English form. The differences in translation methods stem from the translators' distinct subjective choices. Across the corpus, borrowing is most commonly used in the translation of proper nouns that function as lexical cohesive items, including institution names, project names, technical terms, event names, and economic terms, such as 'IMF', 'IBRD', 'IDA', 'ADB', 'DMCs', 'NDRC', 'YGLs', 'ID', 'IT', 'ESG', 'Umbrella', 'TopLink', 'UpLink', 'One Digital Forum', 'GDP', 'FSAP', 'LIBOR', 'GIP', and 'COVID-19'.

Table 6: Example 3: Transposition

| Text                             | ST                                                                                                                                                   | HT                                                   | CT                                           |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------|
| Content                          | The rate of coverage increases as older projects close and new <b>ones</b> are approved; all procurement is expected to apply the framework by 2026. | 随着旧项目的完工和新项目的批准,《采购框架》的覆盖率将继续提高,预计到2026年所有采购都将使用该框架。 | 随着旧项目关闭和新项目获批,这一覆盖率不断提高;预计到2026年,所有采购将适用该框架。 |
| Cohesion and translation methods | <b>ones</b> substitution                                                                                                                             | 项目 transposition                                     | 项目 transposition                             |

The third example presents transposition. Transposition of cohesion involves changing the grammatical structure of cohesive items in the ST while preserving their meaning. In the ST, the word 'ones' functions as an instance of nominal substitution. Both HT and CT employ transposition by changing the part of speech of the pronoun to the noun it substitutes. Unlike in English, pronouns in Chinese are rarely directly modified by adjectives. The similarity in translation methods can be attributed to the translators' shared orientation toward target-language norms. Across the corpus, transposition involves changes in part of speech, rank shift, and structural transformation, such as structural repetition.

The fourth example displays modulation. Modulation of cohesion entails altering the perspective of cohesive elements while preserving their meaning. In the ST, the word 'same' serves as a comparative reference. HT employs literal translation by using semantically corresponding Chinese counterparts, whereas CT uses modulation through double negation. The variation in translation methods arises from the translators' distinct subjective decisions. Across the corpus, modulation manifests in forms such as general-to-particular conversion and the negation of the opposite.

Table 7: Example 4: Modulation

| Text                             | ST                                                                                                                                                 | HT                                           | CT                                               |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------|
| Content                          | In its virtual form, the Annual Meetings enjoyed the <b>same</b> calibre of participants from all industries and sectors as the physical meetings. | 和参加线下会议一样, 参加线上年会的各行业参会者具有 <b>同样</b> 水准的高素质。 | 在其虚拟形式下, 年会仍然吸引了来自各行各业的高水平参与者, 与实体会议 <b>无异</b> 。 |
| Cohesion and translation methods | <b>same</b> reference                                                                                                                              | <b>同样</b> literal translation                | <b>无异</b> modulation                             |

Table 8: Example 5: Equivalence

| Text                             | ST                                                                                                                                                                                                                                                                                                                                                                                                                   | HT                                                                                                                                                            | CT                                                                                                                                                |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Content                          | Collectively, these efforts enable us to deliver effective, efficient, and <b>tailored</b> support to countries to help them achieve more resilient, sustainable, and inclusive development. Since July 2016, the Bank's Procurement Framework has enabled <b>tailored</b> procurement approaches for Investment Project Financing operations, emphasizing sustainability and value for money in public procurement. | 这些努力结合起来, 使我们得以向各国提供有效、高效、 <b>因地制宜</b> 的支持, 帮助他们实现更具韧性、可持续性和包容性的发展。<br><br>自 2016 年 7 月以来, 世行《采购框架》允许投资项目融资 (IPF) 业务采用 <b>量身定制</b> 的采购方法, 强调公共采购的可持续性和物有所值要求。 | 这些努力使我们能够为各国提供有效、高效且 <b>量身定制</b> 的支持, 帮助他们实现更具韧性、可持续和包容性的经济发展。<br><br>自 2016 年 7 月以来, 世界银行的采购框架为投资项目融资运营提供了 <b>量身定制</b> 的采购方法, 强调公共采购中的可持续性和物有所值。 |
| Cohesion and translation methods | <b>tailored</b> lexical cohesion<br><br><b>tailored</b>                                                                                                                                                                                                                                                                                                                                                              | <b>因地制宜</b> equivalence<br><br><b>量身定制</b> equivalence                                                                                                        | <b>量身定</b> equivalence<br><br><b>制的</b> equivalence                                                                                               |

The fifth example reflects equivalence. Equivalence of cohesion pertains to rendering cohesive items using different stylistic or structural means, providing a functionally or culturally similar expression while preserving their meaning. In the ST, the two words 'tailored' build lexical cohesion through repetition. Both HT and CT employ equivalence by incorporating the Chinese four-character idioms '因地制宜' (meaning 'adapting to local circumstances') and '量身定制' (a variant of the Chinese idiom '量体裁衣', meaning 'custom-made to measurements'). The similarity in translation methods arises from the

translators' coinciding subjective choices. Across the corpus, HT and CT apply this method through the integration of Chinese idioms in their translations.

Table 9: Example 6: Omission

| Text                             | ST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | HT                                                                                                                                                                                                                | CT                                                                                                                                                                                   |                     |      |                     |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------|---------------------|
| Content                          | Among other changes, Contingent Disaster Financing, which provides <b>DMCs</b> with <b>budget support</b> linked to disasters and <b>emergencies</b> , now also covers health <b>emergencies</b> and is more widely available under concessional resources. Meanwhile, the Countercyclical Support Facility, which provides <b>emergency budget support</b> for <b>DMCs</b> facing external shocks, now allows permanent access for concessional-assistance-only <b>DMCs</b> and improved financing terms and limits for borrowers. | <p>一种是<b>为发展中成员体</b>提供与灾害和<b>紧急情况</b>相关<b>预算支持</b>的应急灾害融资，其如今也涵盖<b>突发卫生事件</b>，并且扩大了优惠资源的覆盖范围。</p> <p>另一种是为面临外部冲击的<b>发展中成员体</b>提供<b>紧急预算支持</b>的“反周期支持机制”，其如今已允许仅限可获得优惠援助的<b>发展中成员体</b>永久使用该机制，并且完善了借款人融资条款和限额。</p> | <p>其中，灾害应急融资 (Contingent Disaster Financing)现涵盖卫生<b>紧急情况</b>，并在优惠资源下更广泛可用。</p> <p>同时，反周期支持工具 (Countercyclical Support Facility)允许仅接受优惠援助的<b>成员国</b>永久使用，并为借款方提供更优惠的融资条款和更高的借款限额。</p> |                     |      |                     |
| Cohesion and translation methods | <b>DMCs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | lexical cohesion                                                                                                                                                                                                  | 发展中成员体                                                                                                                                                                               | literal translation | /    | omission            |
|                                  | <b>DMCs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                   | 发展中成员体                                                                                                                                                                               | literal translation | /    | omission            |
|                                  | <b>DMCs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                   | 发展中成员体                                                                                                                                                                               | literal translation | 成员国  | literal translation |
|                                  | <b>budget support</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | lexical cohesion                                                                                                                                                                                                  | 预算支持                                                                                                                                                                                 | literal translation | /    | omission            |
|                                  | <b>budget support</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                   | 预算支持                                                                                                                                                                                 | literal translation | /    | omission            |
|                                  | <b>emergencies</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | lexical cohesion                                                                                                                                                                                                  | 紧急情况                                                                                                                                                                                 | literal translation | 紧急情况 | literal translation |
|                                  | <b>emergencies</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                   | 突发...事件                                                                                                                                                                              | literal translation | /    | omission            |
|                                  | <b>emergency</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                   | 紧急                                                                                                                                                                                   | literal translation | /    | omission            |

The sixth example illustrates omission. Omission of cohesion refers to cases in which cohesive items in the ST are not rendered with corresponding lexical elements in the translation. In the ST, the bolded items establish lexical cohesion through repetition. HT adopts literal translation by consistently using semantically corresponding expressions, whereas CT applies literal translation to the third occurrence of 'DMCs' and the first occurrence of 'emergencies' but omits the others. These differences in translation methods reflect the translators' distinct subjective choices. The use of literal translation in HT is appropriate because each instance of lexical cohesion conveys its meaning

clearly. Nevertheless, the use of omission in CT is inappropriate. As CT omits two clauses in the ST, 'which provides DMCs with budget support linked to disasters and emergencies' and 'which provides emergency budget support for DMCs facing external shocks', the cohesive lexical items are removed, resulting in substantial information loss. Therefore, the omission observed in CT constitutes a translation error stemming from inadequate comprehension of the source content. Across the corpus, in the translation of reference, omission is widely used for the definite article 'the'. Pronouns such as 'this', 'these', 'those', 'we', 'our', 'it', 'its', 'they', 'their', 'them', and 'such' are also frequently omitted. Omission is occasionally applied in the translation of comparative adjectives, the adjective 'other', and the preposition 'as'. With regard to conjunctions, omission is occasionally used when translating 'also', 'and', 'for example', 'meanwhile', 'now', 'as a result', and 'consequently'.

#### 4.2. Distribution of Translation Methods of Cohesion

The ST contains 3,775 instances of cohesive devices, comprising reference, substitution, conjunction, and lexical cohesion, with no instances of ellipsis. Table 10 presents the frequency of the methods used by the HT and CT to translate these cohesive devices, as well as their similarities and differences. The proportions of translation methods in HT and CT are shown in Figures 3 and 4, respectively. The proportions of translation methods for cohesive devices in HT and CT are shown in Table 11.

Table 10: Translation Methods of Cohesive Devices in HT and CT

| Cohesive devices | Translation methods in HT                                                                                              | Translation methods in CT                                                                                              | Similarity or difference of translation methods |
|------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| reference        | literal translation: 235<br>transposition: 84<br>modulation: 24<br>omission: 573                                       | literal translation: 250<br>transposition: 76<br>modulation: 15<br>omission: 575                                       | similarity: 783<br>difference: 133              |
| substitution     | transposition: 1                                                                                                       | transposition: 1                                                                                                       | similarity: 1                                   |
| conjunction      | literal translation: 74<br>/<br>omission: 7                                                                            | literal translation: 70<br>transposition: 3<br>omission: 8                                                             | similarity: 67<br>difference: 14                |
| lexical cohesion | literal translation: 2211<br>borrowing: 72<br>transposition: 268<br>modulation: 176<br>equivalence: 6<br>omission: 44  | literal translation: 2254<br>borrowing: 76<br>transposition: 236<br>modulation: 126<br>equivalence: 7<br>omission: 78  | similarity: 2489<br>difference: 288             |
| total            | literal translation: 2520<br>borrowing: 72<br>transposition: 353<br>modulation: 200<br>equivalence: 6<br>omission: 624 | literal translation: 2574<br>borrowing: 76<br>transposition: 316<br>modulation: 141<br>equivalence: 7<br>omission: 661 | similarity: 3340<br>difference: 435             |

Figure 3: Translation Methods of Cohesive Devices in HT

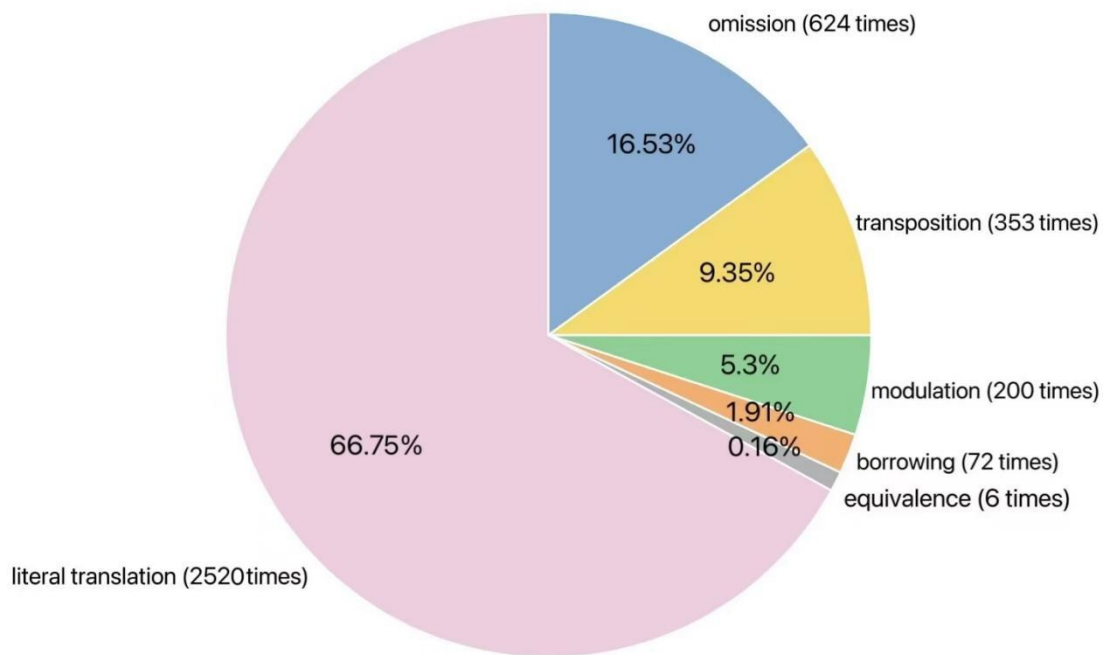
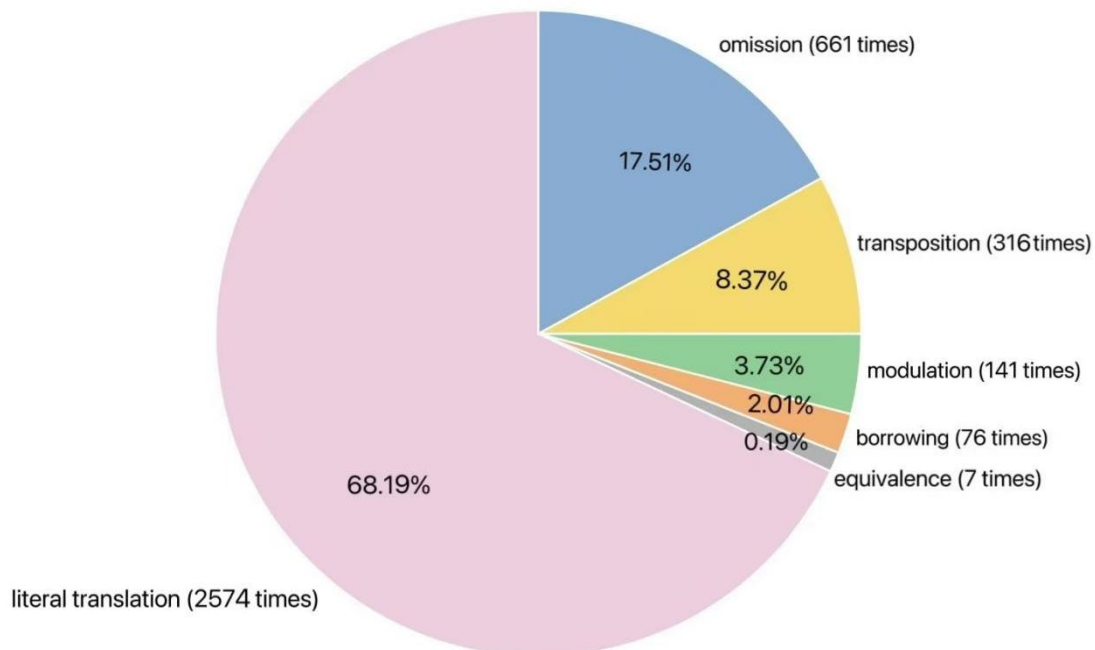


Figure 4: Translation Methods of Cohesive Devices in CT



From the perspective of overall translation method categories, HT and CT are consistent. The two translations employ the same six categories of translation methods, namely omission, literal translation, borrowing, transposition, modulation, and equivalence, whereas calque and adaptation are not used. In both translations, in descending order of proportion, literal translation is the most frequently used method, accounting for roughly two-thirds; omission and transposition are next, amounting to approximately 17% and 9%, respectively; modulation is employed in 3.5% to 5.5% of cases; this is followed by borrowing, which makes up approximately 2%; equivalence is the least used, constituting less than 0.2%.



As for the percentage of strategy use, HT and CT are largely comparable. In terms of the choice of strategies, direct strategies (literal translation and borrowing), omission, and oblique strategies (transposition, modulation, and equivalence) account for 68.66%, 16.53%, and 14.81%, respectively, in HT, while the corresponding figures are 70.20%, 17.51%, and 12.29%, respectively, in CT. Therefore, for both HT and CT, direct strategies are used most frequently, followed by omission, with oblique strategies used least.

Table 11: Proportions of Translation Methods of Cohesive Devices in HT and CT

| Translation methods | Cohesion in HT |        |        | Cohesion in CT |        |        |
|---------------------|----------------|--------|--------|----------------|--------|--------|
| Literal translation | reference      | 6.22%  | 66.75% | reference      | 6.62%  | 68.19% |
|                     | conjunction    | 1.96%  |        | conjunction    | 1.86%  |        |
|                     | lexical        | 58.57% |        | lexical        | 59.71% |        |
|                     | cohesion       |        |        | cohesion       |        |        |
| Borrowing           | lexical        | 1.91%  | 1.91%  | lexical        | 2.01%  | 2.01%  |
|                     | cohesion       |        |        | cohesion       |        |        |
| Transposition       | reference      | 2.22%  | 9.35%  | reference      | 2.01%  | 8.37%  |
|                     | substitution   | 0.03%  |        | substitution   | 0.03%  |        |
|                     | /              | /      |        | conjunction    | 0.08%  |        |
|                     | lexical        | 7.1%   |        | lexical        | 6.25%  |        |
| Modulation          | cohesion       |        |        | cohesion       |        |        |
|                     | reference      | 0.64%  | 5.3%   | reference      | 0.4%   | 3.73%  |
|                     | lexical        | 4.66%  |        | lexical        | 3.33%  |        |
| Equivalence         | cohesion       |        |        | cohesion       |        |        |
|                     | lexical        | 0.16%  | 0.16%  | lexical        | 0.19%  | 0.19%  |
| Omission            | cohesion       |        |        | cohesion       |        |        |
|                     | reference      | 15.18% | 16.53% | reference      | 15.23% | 17.51% |
|                     | conjunction    | 0.18%  |        | conjunction    | 0.21%  |        |
|                     | lexical        | 1.17%  |        | lexical        | 2.07%  |        |
|                     | cohesion       |        |        | cohesion       |        |        |

HT and CT also show a high proportion of shared translation methods for cohesive devices. Specifically, the similarity rates for the translation methods of reference, substitution, conjunction, and lexical cohesion are 85.48%, 100%, 82.72%, and 89.63%, respectively. Considering all cohesive devices in the ST, the translation methods employed in HT and CT demonstrate a similarity rate of 88.48%. In general, HT and CT share more than four-fifths of their translation methods for cohesive devices.

Nevertheless, the frequencies of the six translation methods used in HT and CT vary slightly, with all differences remaining below 1.6%. Overall, HT uses transposition and modulation more frequently than CT, with proportions of 0.98% and 1.57%, respectively, while HT uses literal translation, borrowing, equivalence, and omission less frequently than CT, with proportions of 1.44%, 0.10%, 0.03%, and 0.98%, respectively. HT and CT show relatively small differences in their use of borrowing and equivalence, at 0.1% or below, whereas the differences in their use of omission, transposition, literal translation, and modulation are comparatively larger, ranging from approximately 1% to 1.6%.

Despite showing similar overall proportions in strategy use, CT and HT exhibit minor differences in preference. CT relies more on direct strategies and omission than HT,

increasing by approximately 1.54% and 0.98%, respectively, while the use of oblique strategies decreases by about 2.52%. Notably, when translating each type of cohesive device (reference, conjunction, and lexical cohesion), CT employs omission more frequently than HT, by approximately 0.05%, 0.03%, and 0.9%, respectively. This suggests that omission is applied more extensively in CT than in HT.

For the four types of cohesive devices, a higher frequency of a device corresponds to a greater number of translation method categories used by HT and CT. The proportions of lexical cohesion, reference, conjunction, and substitution decrease successively, and the number of translation method categories used for them in both translations also declines accordingly. From another perspective, a higher number of translation methods corresponds to a wider range of cohesive device types in HT and CT. Literal translation, omission, and transposition, which are used more frequently, are applied to three or four types of cohesive devices. Modulation is used for two types (reference and lexical cohesion), whereas less frequently used strategies, borrowing and equivalence, appear only in the translation of lexical cohesion.

In translating specific types of cohesive devices, HT and CT employ identical categories of translation methods for reference (four categories), substitution (one category), and lexical cohesion (six categories); however, they use different categories of translation methods for conjunction. HT employs omission and literal translation, whereas CT uses not only these two methods but also transposition. CT uses transposition when translating conjunction three times in the corpus, all in the same context, as shown in Table 12 for the translation of ‘also’.

Table 12: Example of Differences in Translation Method Categories for Cohesion between HT and CT

| Text                             | ST                                                                                                                                                        | HT                                        | CT                                        |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------|
| Content                          | We <b>also</b> work through trust funds and financial intermediary funds to deploy rapid financing and generate knowledge for key development priorities. | 我们还通过信托基金和金融中介基金来部署快速融资、产生关于关键发展优先事项的新知识。 | 此外，我们还通过信托基金和金融中介基金部署快速融资，并为关键发展优先事项生成知识。 |
| Cohesion and translation methods | <b>also</b> conjunction                                                                                                                                   | 还 literal translation                     | 此外... transposition<br>还                  |

In the ST, the word ‘also’ is an item of extension conjunction. HT adopts the literal translation ‘还’, which serves as an equivalent of ‘also’. CT employs transposition by changing a single adverb into a conjunctive structure, ‘此外...还’. The expression ‘此外’ means ‘furthermore’ or ‘in addition’ and produces a reinforcing effect when paired with ‘还’. These differences in translation methods may be attributed to translators’ subjective choices. On the whole, for each type of cohesive device, CT and HT use broadly similar categories of translation methods.

This study further reveals that lexical cohesion plays a greater role than grammatical cohesion in constructing meaning in English-Chinese translation. The distribution of



cohesive devices in English-Chinese translation identified in this study closely aligns with the findings of Zhao et al. (2009), which indicate that lexical cohesion is used most extensively, followed by reference and conjunction, whereas ellipsis and substitution occur only at very low frequencies. This suggests a consistent tendency in English-Chinese translation to rely primarily on lexical cohesion, while ellipsis and substitution play only a marginal role.

Both HT and CT display a moderate source-text-oriented tendency in English-Chinese business translation of cohesion: the English source text's structure and meaning are preserved, while some minor adjustments for the Chinese target language are allowed. Direct translation strategies are source-text-oriented, while oblique translation strategies are target-text-oriented (Ngoran, 2016). Direct strategies occur 4.64 times more frequently than oblique strategies in HT, and 5.71 times more frequently in CT. While both translations predominantly use direct strategies, HT exhibits a stronger tendency toward oblique strategies, reflecting greater adherence to Chinese target-language norms.

The similarity in the translation methods of HT and CT can be attributed to their accommodation to target-language expression and convergent subjective choices, whereas the differences arise from divergent subjective choices and translation errors. Thus, observations from the data in this study highlight that the specific factors influencing English-Chinese cohesion translation include the translator's subjective choices, target-language adjustments, and comprehension errors.

Omission accounts for approximately one-sixth of the cases in both HT and CT, suggesting that English business texts employ a higher density of cohesive devices than their Chinese translations. This also supports previous findings, which point out that connectives commonly required in English and other Western languages are often unnecessary in Chinese, as Chinese tends to structure coordinate and subordinate clauses through parataxis, whereas English relies more heavily on hypotactic constructions (Loh, 1958; Tong, 2024; Zhao et al., 2009).

## 5. Conclusion

This research examines the translation methods used by human translators and ChatGPT in rendering cohesion in business annual reports from English to Chinese, highlighting their similarities and differences. The results show that HT and CT demonstrate a high degree of consistency in both the categories and overall distribution of translation methods used to render cohesive devices. Both translations employ the same six methods, namely literal translation, borrowing, transposition, modulation, equivalence, and omission. They display broadly comparable proportions in strategy adoption, with direct strategies predominating, followed by omission and oblique strategies. The two translations also share a substantial overlap in the translation of cohesive devices, with an overall similarity rate exceeding four-fifths. Although minor quantitative differences exist in the frequencies of individual methods and in strategic preferences, particularly CT's slightly greater reliance on direct strategies and omission, these variations remain limited in scope. Both translations exhibit similar patterns in method selection across device categories, with divergence observed only in the treatment of conjunction. Translation errors were also observed in CT's use of omission, highlighting the necessity of post-editing.

The translation methods identified in this study offer practical guidance for cohesion translation and provide further empirical evidence for comparing human and AI translation in specialized business texts, highlighting persistent gaps between human and machine translation. Since the findings of this study cover only a limited portion of cohesion in English-Chinese business report translations, future research should expand the scope of analysis by including a larger and more diverse corpus across various industries and contexts. Comparative studies on cohesion in English-Chinese translation should also consider different genres and text types. Moreover, future research could compare human translations with those produced by a broader range of AI models.

### **Ethics Approval and Consent to Participate**

This study employed an interpretive textual analysis and did not involve personal data or human participants; therefore, informed consent was not required.

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