

## *Original Paper*

# The Application of Machine Translation and Post-Editing in Industrial Text Translation-Taking an Excerpt from *Hubei Industrial Culture and Design* as an Example

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### ***Abstract***

*The rapid development of computer and network technologies has led to the increasing acceptance and application of the “machine translation + post-editing” translation model by language service providers. While the quality of machine translation has significantly improved, errors still persist in the output, indicating that human translation cannot be entirely replaced. Therefore, manual post-editing and proofreading play a crucial role in enhancing the quality of machine-translated texts. This study takes an excerpt from Hubei Industrial Culture and Design as an example, employs a case study method and chooses two machine translation tools including DocHero.ai and Google. By contrasting the machine-translated versions with manually edited English translations, the study analyzes errors in machine translation in industrial text translation and highlights the differences between machine translation and human translation. It also discusses considerations for machine translation, proposes corresponding post-editing methods for different types of machine translation errors, and summarizes English translation strategies and methods for industrial texts, aiming to provide insights for Chinese-English translation of industrial information texts.*

### ***Keywords***

*machine translation, post-editing, industrial texts, Hubei Industrial Culture and Design*

## **1. Introduction**

The current trend of digital and intelligent translation services is strong, especially in the translation of scientific literature, legal documents, manuals, agriculture, medical materials, industrial patents, brochures and other texts. The change in information acquisition methods has led to a transformation in translation modes, shifting from the traditional manual assistance with paper-based reference materials

to the current combination of digital reference resource models and human collaboration models (Cai Yuan & Wang Hui, 2023). However, because digital translation environments come with real threats, the future translation market will require human-machine collaboration in translation, introducing human-driven elements into data-driven processes, optimizing machine translation results through post-editing. Increasingly, people are using machine translation tools to improve their work efficiency in work and study environments. It is worth noting that current machine translation tools on the market may not accurately convey the original content, particularly in literary texts. Additionally, errors such as “inaccurate words” and “confused syntax” exist in texts such as technology, news, and government reports, leading to unreadable translations. Informational texts differ from other texts as they focus on content and facts, requiring different translation processes and methods. For such texts, translations should use simple language to maximize the retention of the original language style and content. However, machine translation may not always fully capture the original language style and context, necessitating human post-editing to correct errors and enhance translation quality and efficiency.

With the rapid development of artificial intelligence, machine translation tools have emerged, including Bing, Baidu, Google and Youdao Translate. Google Translate claims that since the introduction of its neural machine system, it has “elevated translation quality to near human translation levels, reducing error rates by 60% compared to the previous phrase-based statistical machine translation system” (Sekino, 2015). DocHero.ai, a translation tool as a plugin, is less well-known and used compared to Youdao, Baidu and Google Translate. However, through the author’s daily translation practice and experimentation, this translation tool has shown high accuracy in Chinese-English translation, with high translation quality and efficiency. It also offers different translation language styles, meeting the demands of industrial text translation. This is one of the key factors influencing the author’s choice of Google and DocHero.ai translation tools as machine translation references. Although machine translation is widely used due to its advantages, it is still not perfect, and its limitations are evident. The quality of the output translation is difficult to match the level of professional translators. Therefore, human intervention in post-editing translations is necessary to ensure the professionalism and accuracy of the translated text.

## **2. Machine Translation and Post-Editing**

The application research of the “machine translation+post-editing” mode in the field of translation has become a hot topic in the academic community. In recent years, the “machine translation+post-editing” mode has been increasingly adopted by the language service industry. According to The State of the Linguist Supply Chain research report published by the American research institution in 2020, it was revealed that by the end of 2020, 35% of language service providers globally were offering translation services using the “machine translation+post-editing” mode to clients (Alsohybe & Dahan, 2017). In the future, with the advancement of technology, the role played by the translation mode in the language service industry will only become more significant, potentially even becoming the mainstream choice in translation modes. The trend towards interactive human-machine translation is undeniable.

### 2.1 Machine Translation

Machine translation refers to the process of using computers to convert one natural language into another. This involves segmenting sentences into words, comparing meanings, analyzing grammar, rearranging combinations and generating the target language translation. Since the beginning of the 21st century, the acceleration of globalization and localization processes has led to a growing prominence of machine translation. This shift is due to the inability of relying solely on human translation to meet the significant market demand. The translation quality produced by modern machine translation technology has evolved from the initial rule-based machine translation to the more intelligent neural-based machine translation today (Wang Junsong, Xiao Weiqing, & Cui Qiliang, 2023).

In recent years, pioneers in machine translation both domestically and internationally have gradually made their mark on the global stage. With the continuous improvement in machine translation quality, the 2022 International Workshop on Machine Translation (WMT) introduced a new set of rules. These rules no longer solely rely on news corpora as the testing dataset but emphasize enhancing machine translation performance in general domains, including a broader range of corpora in areas such as e-commerce and healthcare, imposing higher standards on machine translation quality than in previous years. These developments demonstrate the significant progress of machine translation (Krings, 2001). While early machine translations were often criticized for their quality, it is undeniable that current neural network machine translation can swiftly translate large text content and assist readers in quickly grasping the text's structure, capturing key information, and understanding the main idea. Furthermore, compared to human translation, machine translation holds a distinct advantage in terms of handling cognitive load. Studies in cognitive psychology indicate that human working memory is limited, and prolonged exposure to high cognitive loads can lead to fatigue. Outside regular working hours, translators may experience negative factors such as physical discomfort, emotional disturbances, and reduced attention, resulting in passive physical blows and decreased work efficiency. In contrast, machine translation, as long as it has proper hardware facilities, can tirelessly operate, a feat impossible for human translators.

### 2.2 Post-Editing

Translation post-editing is the process of “checking and correcting machine-translated output”. It involves refining and modifying the original output of machine translation for specific purposes, including correcting translation language errors, improving the accuracy and readability of machine-translated output. The International Organization for Standardization Draft Standard ISO18587 (2017) categorizes translation post-editing into two levels: light post-editing and full post-editing. The level or extent of translation post-editing depends on the client's requirements for translation quality. Light post-editing involves quickly correcting obvious errors to enhance reader understanding with minimal human intervention. On the other hand, full post-editing, also known as “heavy or deep post-editing”, not only meets the requirements of light post-editing but also considers refining and modifying sentences to ensure smoother coherence between them (Gaspari & Nisioi, 2017). Translation post-editing effectively addresses issues in machine translation, achieving high-quality and efficient translation results.

While machine translation offers the advantage of quickly generating translations and capturing key information, it inevitably requires human translators to maintain accuracy in vocabulary and syntax, as well as ensuring consistency and logical relationships within the context. Therefore, in actual translation projects, machine translation can only serve as a “preliminary translation” with the crucial step of post-editing needed to ensure translation quality. Automated machine translation systems can process text rapidly, but their quality is slightly lower than that of skilled human translators. To bridge this quality gap, the translation industry is exploring post-editing, which involves human correction of machine output. For complex sentences, obtaining accurate translations directly from machine translation is challenging, yet we can extract various “relevant information” to quickly identify and adjust translations accordingly. The task of post-editing is to make necessary modifications to the translated text generated by machine translation to achieve the desired translation quality (Koponen & Salmi, 2017). It is evident that the assisting role of machine translation is significant. Looking back at the evolution of machine translation, it is undeniable that utilizing machines for translation work is a major trend for the future. However, in this process, post-editing will undoubtedly play a role in addressing some issues and shortcomings of machine translation, which is why the author has chosen to adopt this perspective.

### **3. Error Types of Machine Translation and Cases Analysis of Post-Editing**

#### *3.1 Lexical Error*

In industrial text translation, due to the extensive historical and cultural connotations present in industrial documents, there are numerous industry-specific terms and technical jargon. These terms are closely related to the social and cultural background and language habits of the source language, making them highly specialized. It is essential to convey information accurately and precisely in a formal and serious manner, maintaining a dignified and accurate style and vocabulary (Chen Miao & Liu Zhengxi, 2024). Therefore, in industrial text translation, the precise matching of term meanings is influenced by various factors such as the professional field, semantic collocation, and contextual factors. Machine translation currently lacks precise control over these factors, leading to deviations in term translation. Source language readers who are familiar with the relevant background knowledge can correct machine translation errors and adjust them to fit the context, thereby enhancing the clarity of the translation and improving its readability.

##### **3.1.1 Mistranslation of Industrial Proper Nouns**

The industrial texts involve a significant amount of industrial proper nouns translation, including plant names, company names, machine names, brand names, and technical terminology translation. Therefore, the accuracy of industrial proper nouns translation plays a crucial role in the quality and effectiveness of industrial text translation, making it a critical aspect during the translation process. Machine translation sometimes fails to accurately identify the translation of certain professional terms, leading to cases of mistranslation of proper nouns (Wei Zichun & Li Zhounfeng, 2023). In this translation practice, numerous

instances of mistranslation of industrial proper nouns were identified, prompting the analysis of several cases for post-editing.

#### Example 1

Original Text: 亚细亚火油公司

DocHero.ai Translation: Asia Oil Company

Google Translation: Asian Fire Oil Company

Post-translation Editing: Asiatic Petroleum Company

#### Example 2

Original Text: 贝色麻炉钢厂

DocHero.ai Translation: The Beise Ma Lu Steel Factory

Google Translation: Best Steel Steel Factory

Post-translation Editing: Bessel Hemp Furnace Steelworks

Analysis: the industrial text of *Hubei Industrial Culture and Design* contains numerous factory names, company names, machine names, and product names, all of which are considered industrial proper nouns with specific expressions. In examples 1 and 2, the translations of the company name “亚细亚火油公司” and the factory name “贝色麻炉钢厂” by DocHero.ai and Google Translate were found to be inaccurate. DocHero.ai translated “火油” directly as the single word “Oil”, while Google translated it as “Fire Oil”, both of which are incorrect. Additionally, DocHero.ai phonetically translated “麻炉” as “Ma Lu”, and Google provided a translation that seemed completely unrelated to the original text, as “Best Steel Steel Factory”, resulting in confusion. Therefore, when translating such proper nouns, it is advisable not to blindly trust machine translations. Instead, one should proactively consult professional terminology databases online to ensure the accuracy of the translation.

#### Example 3

Original Text: 其所生产的步枪为改良后的德国 1888 式 7.9 毫米口径毛瑟枪，即著名的汉阳式 79 步枪——汉阳造。

DocHero.ai Translation: The rifle produced is the modified German 1888 Mauser rifle with a caliber of 7.9mm, known as the Hanyang Type 79 rifle - manufactured by Hanyang.

Google Translation: The rifle produced is a modified German 1888 7.9 mm caliber Mosetar, namely the famous Hanyang 79 rifle-Hanyang made.

Post-translation Editing: The rifle produced is the modified German 1888 Mauser rifle with a caliber of 7.9mm, known as the Hanyang Type 79 rifle-Hanyang Rifle.

#### Example 4

Original Text: 白沙洲造纸厂在初创时期所用的 5 台机器均为比利时产 86 英寸长网造纸机。

DocHero.ai Translation: The five machines utilized at the initial stages of the Baisha Island Paper Mill were all 86-inch long wire paper machines manufactured in Belgium.

Google Translation: The five machines used by Baishazhou Paper Factory during the start-up period are all produced by Belgian 86-inch long net paper machines.

Post-translation Editing: The five machines utilized at the initial stages of the Baishazhou Paper Mill were all 86-inch fourdrinier machines manufactured in Belgium.

Analysis: Translation error in the proper noun appearing in Example 3 is the term “汉阳造”. The term “汉阳造” refers to an improved rifle, which is actually a product name, specifically “汉阳造步枪” (Hanyang Rifle). Both DocHero.ai and Google translated this term literally as “manufactured by Hanyang” and “Hanyang made”, meaning “在汉阳制造”. These translations overlook the true meaning of the term in the original context, resulting in a mistranslation that conveys inaccurate information and leads to confusion, which requires manual post-editing in context. Due to the lack of an exact English equivalent for the product name “汉阳造”, a transliteration combined with amplification is deemed necessary, hence translating it as “Hanyang Rifle” aligns better with the original text. In Example 4, industrial proper nouns “白沙洲造纸厂” and “86 英寸长网造纸机” are misinterpreted by DocHero.ai and Google as “Baisha Island Paper Mill” and “Baishazhou Paper Factory”, and “86-inch long wire paper machines” and “86-inch long net paper machines” respectively. The correct translations should be “Baishazhou Paper Mill” and “86-inch fourdrinier machines”. These inaccuracies in translating proper nouns highlight the challenges machine translation faces, underscoring the importance of post-editing. The “machine translation + post-editing” model plays a pivotal role in enhancing translation accuracy (Yi Yuanyuan, 2023).

#### Example 5

Original Text: 与此同时，汉口燮昌火柴厂为火柴冠名的双狮、单狮、三猫、三鸡、象等品牌，也是武汉工业产品最早使用的近代商标。

DocHero.ai Translation: Meanwhile, the Hankou Xiechang Match Factory, which produced matches under brands such as Double Lion, Single Lion, Three Cats, Three Chickens, and Elephant, was also one of the earliest modern trademarks used for industrial products in Wuhan.

Google Translation: At the same time, the Hankou Xiechang Match Factory named the Shuangshi, Danshi, Sanmao, Xiang and other brands named the match. It is also the earliest modern trademark used in Wuhan industrial products.

Post-translation Editing: At the same time, the Hankou Xiechang Match Factory was known for its brands including Double Lion, Single Lion, Three Cats, Three Chickens, and Elephant, which were among the earliest modern trademarks used in Wuhan’s industrial products.

Analysis: The main focus of example 5 is the translation of match brand names “双狮、单狮、三猫、三鸡、象”. DocHero.ai adopts a literal translation approach, rendering them as “Double Lion, Single Lion, Three Cats, Three Chickens, and Elephant”, while Google uses a transliteration method to translate them as “Shuangshi, Danshi, Sanmao, Xiang”. By directly translating the original names, staying faithful to the source text, there is a high level of semantic relevance between the original and translated versions. The popularity of English in China has strengthened people’s sense of identification with the relevance between the original and translated names. In addition, in Chinese-English translation, when dealing with culture-loaded words or concepts lacking equivalence in another culture, transliteration is often used due

to the absence of direct equivalents. However, since the match brand names in the original text are all named after animals, there are direct corresponding expressions and imagery in the English language, eliminating the need for transliteration. Furthermore, online searches reveal that matchbox packaging named after animals consistently use literal translation methods, accompanied by the image of the respective animal, translating them as “Double Lion, Single Lion, Three Cats, Three Chickens, and Elephant”. Therefore, for the translation of proper nouns like brand names, DocHero.ai’s translation is more accurate than Google’s, indicating significant potential for improvement in machine translation accuracy in the future.

### 3.1.2 Mistranslation of Culture-Loaded Words

Culture-loaded words refer to words, phrases and expressions that represent specific activities accumulated by a particular ethnicity or country throughout history. Each country has its own vocabulary and phrases based on historical and cultural characteristics. The material culture, institutional culture, customs and spiritual culture of a nation can influence its language and vocabulary system, leading to the emergence of culture-loaded words. Generally, culture-loaded words can be classified into three main types: words related to material culture, words related to institutional culture and customs, and words related to spiritual culture (Wei Zichun & Li Zhoufeng, 2023).

#### Example 6

Original Text: 塔顶有望丁日夜轮流巡视,以监视全汉口地区的火灾。

DocHero.ai Translation: The tower top is under constant surveillance day and night to oversee fire incidents across the entire area of Hankou.

Google Translation: The top of the tower is expected to inspect day and night to monitor the fire in the Hankou area.

Post-translation Editing: The top of the tower was under surveillance of guards day and night, taking turns to monitor any signs of fire in the entire Hankou area.

Analysis: The use of the term “望丁” in this sentence carries significant cultural connotations. In Chinese culture, “望丁” has different meanings in various contexts, such as in genealogy where it refers to an unborn male child already conceived during compilation, with the term “望” implying a sense of anticipation as girls are not recorded in the genealogy. In the original text, based on the context, we can infer that “望丁” refers to patrol or guard personnel, hence translating it as “guards” would be appropriate. However, both DocHero.ai and Google Translate opt for an omission translation method, omitting the translation of “望丁”, which conveys specific information and Chinese culture in the original text. Therefore, it is crucial not to overlook such cultural-loaded terms during translation. Moreover, as these terms are unique to Chinese culture without direct equivalents in English, this leads to translation gaps in machine translation. Therefore, human post-editing is essential when dealing with the translation of such cultural-loaded terms. Editors need to fully grasp the cultural connotations behind the original text and choose the most accurate target language equivalent accordingly, addressing any omissions or deficiencies in machine translation to enhance the completeness and accuracy of the translation.

### Example 7

Original Text: 后来几经调试与改进, 生产范围从印刷用纸和装饰用纸扩大到新闻纸、印书纸、连史纸、毛边纸等。

DocHero.ai Translation: After several rounds of testing and improvement, the production range has expanded from printing and decorative paper to include newsprint, book paper, bond paper, and handmade paper.

Google Translation: Later, after several debugging and improvement, the production scope of production was expanded from printing paper and decoration paper to news paper, printing paper, linked historical paper, woolen paper, etc.

Post-translation Editing: Later through adjustments and improvements, the mill expanded its production range from printing paper and decorative paper to newsprint, book paper, lian-shi paper (fine paper made from bamboo) and deckle-edged paper (made from bamboo).

Analysis: In Example 7, the terms “连史纸” and “毛边纸” pose translation challenges as unique cultural terms in China. To begin with, it is essential to grasp the cultural connotations of these two terms in Chinese culture. “连史纸” also known as “寿纸千年”, originates from the papermaking craft in Liancheng County, Fujian Province. It is made from tender bamboo as raw material, processed through alkali steaming, bleaching, handcrafted bamboo screen sheeting, involving 72 intricate steps. “毛边纸” is a type of paper used for printing ancient texts and calligraphy. Made from bamboo fibers, it is light yellow in color, soft and flexible in texture with strong water absorbency. Understanding the cultural connotations of these two terms reveals that both papers are made from bamboo. Therefore, for translating such terms, the method of transliteration or literal translation with explanation can be employed, rendering them as “lian-shi paper (fine paper made from bamboo) and deckle-edged paper (made from bamboo)”. It is advisable to provide an explanation when these cultural-loaded terms first appear in the text to aid non-native readers in better understanding the original text and Chinese culture. DocHero.ai and Google have adopted literal translation methods, rendering them as “bond paper and handmade paper” and “linked historical paper, woolen paper” respectively. The former translation completely deviates from the original terms, lacking any connection, giving an impression of inaccurate translation, while the latter translation boldly opts for a literal translation, rendering “连史纸” as “linked historical paper”, resulting in a confusing and incomprehensible translation that fails to convey the original text’s information and cultural essence.

#### 3.1.3 Miscollocation of Words and Meanings

Translation of industrial texts requires accurate use of words to efficiently convey information, ensuring precision in both common vocabulary and specialized terminology. In cases where ambiguity may arise, it is essential to translate words accurately and contextually by analyzing the specific context. However, machine translation based on neural networks typically translates word-for-word, making it challenging to analyze context. Additionally, the quality of machine-translated results is influenced by the volume of the translation engine’s corpus, making it difficult to guarantee the translation quality of all vocabulary



(Chen Wei, 2023). Therefore, manual editing in the process should focus on context and tend to make correct word choices based on specific contexts.

#### Example 8

Original Text: 周恒顺机械厂的前身为周天顺炉冶坊，周家世代以经营炉坊为业，生产香炉、神钟、汤罐、鼎锅等日用器件。

DocHero.ai Translation: The predecessor of Zhou Hengshun Machinery Factory was Zhou Tianshun Furnace and Smelting Workshop. The Zhou family has been engaged in the operation of furnaces for generations, producing daily products such as incense burners, ritual bells, soup pots, and tripods.

Google Translation: The predecessor of Zhou Hengshun Machinery Factory was Zhou Tianshun Furnace Metro Square. For generations, the Zhou family used the operation of the furnace workshop as the industry, and produced daily use devices such as incense burner, Shenzhong, soup can, Ding pot and other daily necessities.

Post-translation Editing: The predecessor of Zhou Hengshun Machinery Factory was Zhou Tianshun Furnace and Smelting Workshop. The Zhou family has been engaged in the operation of furnaces for generations, producing daily utensils such as incense burners, ritual bells, soup pots, and tripods.

Analysis: In this sentence, DocHero.ai and Google respectively translate “日用器件” as “daily products” and “daily necessities”. “Products” refer to items produced in nature, chemical or industrial processes, while “necessities” denote essential items or things. However, based on the context of the original text, the emphasis is on daily household items like incense burners, ritual bells, soup pots, and tripods, highlighting utensils or tools used in daily life. “Products” and “necessities” have broader and less specific meanings, encompassing a variety of items, and are not suitable for translating the specific category of “器件”. The term “utensils” specifically refers to tools or implements used in the kitchen or household, which can accurately convey the idea of daily household items. Therefore, using “utensils” to translate “器件” is more precise and aligns better with the original context.

### 3.2 Syntax Error

The syntax mainly examines the grammatical errors, scrambled word order, lack of semantic clarity, reversed logic, and content deficiencies in translations caused by differences between Chinese and English sentence structures. Industrial texts often contain colloquial expressions, idioms, and frequent use of short sentences, making them more challenging to handle. When translating into English using machine translation, it is easy to create disorderly sentence structures and obscure semantics (Deng Juntao & Xu Xinghan, 2023). Furthermore, there is a strong connection between the sentences and history in the text, leading to missing content and unclear expression when describing historical events. Therefore, translators need to make modifications in the later stage, such as adjusting sentence structures and adding translation content.

#### 3.2.1 Logical Disorder

The structural differences between English and Chinese sentences, especially in longer sentences, are significant. English emphasizes form coherence, relying on linguistic structures, including grammatical

and lexical connections, to convey logical relationships between sentences. In contrast, Chinese focuses on semantic coherence, where logical relationships between sentences are not dependent on linguistic structures such as conjunctions but on meaning. Consequently, due to the influence of the sentence structures in the source text, the information to be conveyed can become ambiguous during machine translation, leading to confusion in the logical relationships between sentences (Ma Ruixue, 2022).

#### Example 9

**Original Text:** 外资砖茶厂中蒸汽机的投入与生产，汉阳兵工厂从最初的仿制学习到改进探索，周恒顺机械厂的借鉴与研发，亚细亚火油公司引入煤油并将其推广，既济水电公司对基础民生的改善……

**DocHero.ai Translation:** The investment and production of steam engines in foreign-funded brick tea factories, the Han Yang Arsenal's progression from initial imitation to improvement and exploration, the learning and development at Zhou Hengshun Machinery Factory, and the introduction and promotion of kerosene by the Asia Oil Company all contributed to the improvement of basic livelihood through the Hubei Hydroelectric Company..

**Google Translation:** The input and production of steam engines in foreign-funded brick tea factories, the Hanyang Arsenal's exploration from initial imitation and learning to improvement, the borrowing and research and development of the Zhou Hengshun Machinery Factory, the introduction of kerosene by the Asia Asia Kerosene Company and its popularization, and the improvement of basic people's livelihoods by both the Ji Hydroelectric Power Company..

**Post-translation Editing:** The investment and production of steam engines in foreign-funded brick tea factories, the Han Yang Arsenal's progression from initial imitation to improvement and exploration, the learning and development at Zhou Hengshun Machinery Factory, the introduction and promotion of kerosene by the Asiatic Petroleum Company, and the improvement of basic people's livelihoods by the Jiji Hydroelectric Company..

**Analysis:** When translating a sentence composed of five noun structures that are logically parallel, it is appropriate to use “and” to highlight their coordination. DocHero.ai generally handles the wording and logical structure of the sentence correctly. However, it inaccurately interprets the parallel relationship between the last two nouns as a cause-and-effect relationship, translating them into the meaning of “亚细亚火油公司引入煤油并将其推广有助于既济水电公司对基础民生的改善”. This results in a misleading translation that contradicts the original meaning and relationship between the nouns, leading to confused logic and misinformation for the readers. In contrast, Google Translate, while not as precise in word choice as DocHero.ai, effectively maintains the logical parallelism of the five noun structures in the original sentence, ensuring a more accurate representation of the intended logic.

#### 3.2.2 Complicated Sentence Structure

Machine translation is a process that reproduces the structure and information of the source language text through a “secondary imitation”. As a result, machine translation lacks flexibility in translation strategies and language expression, leading to issues such as overlapping meanings, redundant information, and

unwieldy structures in the original text that are not adequately addressed. This may result in redundant words, repeated functions in the translation, necessitating post-editing for refinement.

#### Example 10

Original Text: 当时的报刊评说:“厂产颇富精采, 厚利丰厚”。

DocHero.ai Translation: The contemporary newspapers and periodicals commented that the factory's production is excellent, with substantial profits and high returns.

Google Translation: At that time, the newspapers and magazines commented that the factory is very brilliant and rich.

Post-translation Editing: The contemporary newspapers and magazines praised the factory's impressive production and substantial profits.

Analysis: The original sentence is concise with a clear sentence structure, making it relatively easy to translate. Both DocHero.ai and Google translate it into a “that” clause structure, turning the content in quotes into complete sentences. While this translation is not incorrect, it results in a complex sentence structure that lacks conciseness, thus not meeting the criteria for a good translation. Additionally, Google only uses “brilliant and rich” to translate “颇富精采, 厚利丰厚”, which, while succinct, is not the most appropriate choice of words and fails to convey the complete meaning. Therefore, it can be translated as a noun structure “the factory's impressive production and substantial profits”, which not only simplifies the sentence structure but also ensures the completeness of the meaning, making it a preferable translation strategy (Deng Juntao & Xu Xinghan, 2023).

#### Example 11

Original Text: “既济”意即“水火相济, 相辅相成”, 二字既源于中华传统文化, 又表明了公司的两大业务供电、供水。

DocHero.ai Translation: The term “既济” embodies the concept of “the harmonious coexistence and mutual support of water and fire”. The two not only originated from the traditional Chinese culture, but also showed the two major businesses of the company-supporting electric and water.

Google Translation: The two words “既济”, meaning “water and fire complement each other”, are derived from traditional Chinese culture and indicate the company's two major businesses: power supply and water supply.

Post-translation Editing: The term “既济” means “the harmonious coexistence and mutual support of water and fire”, reflecting both traditional Chinese culture and the core businesses of the company in electric and water supply.

Analysis: The original sentence, consisting of three clauses that seem to be in parallel, actually implies a logical relationship of companionship. DocHero.ai, however, splits this sentence into two sentences, disrupting the logical relationship between them. It further complicates the sentence structure by using “not only...but also...” and “originated from”, while Google also employs the phrase “derived from”. Adhering to the principle of concise and accurate industrial text, this sentence can be translated using the word “reflecting” to indicate the accompanying state that connects the context, and the simple structure

“both...and...” to link the two noun structures. This kind of translation not only highlights the logical relationship between sentences and connects the context but also simplifies complex sentence structures, making the translation easily understandable for readers.

### 3.2.3 Lack of Information

Machine translation often lacks consideration of the context, cultural background, and implicit information, leading to difficulties in understanding or distortion of the translated text. Therefore, it is necessary to make corrections during post-editing.

#### Example 12

**Original Text:** 汉口燮昌火柴厂采用西方近代工业规范化的工艺操作流程和生产管理方式。全部生产分为 12 个工序，按不同工序设有排版房、上药房、配药房和成包房等 12 种车间。

**DocHero.ai Translation:** The Xiechang Match Factory in Hankou adopts the standardized industrial process and production management methods of Western modern industry. The entire production process is divided into 12 steps, with different workshops such as typesetting room, coating room, blending room, and packaging room established for each step.

**Google Translation:** Hankou Xiechang Matching Factory adopts the standardized process operation process and production management methods of modern Western modern industrial industrial. All production is divided into 12 processes. There are 12 kinds of workshops including typesetting rooms, pharmacies, pharmacy, and urban rooms in different processes.

**Post-translation Editing:** The Hankou Xiechang Match Factory adopts the standardized industrial process and production management methods of Western modern industry. The entire production process is divided into 12 steps, with different workshops such as typesetting rooms (rooms used for arranging match sticks), waxing rooms (rooms used for applying chemicals to the match sticks), mixing rooms (rooms used for preparation of chemical formulations), and packaging rooms (rooms used for packing matches).

**Analysis:** The correct translation of the factory name “汉口燮昌火柴厂” should be “Hankou Xiechang Match Factory”. Both DocHero.ai and Google provided incorrect translations. Furthermore, the challenging part to translate in this sentence is the names of the workshops such as “排版房，上药房，配药房，成包房”. Both machine translations rendered them literally as “typesetting room, coating room, blending room, and packaging room” and “typesetting rooms, pharmacies, pharmacy, and urban rooms”, completely detached from the context and true meanings of these terms. Readers unfamiliar with industrial culture and match production workshops lack background information on these rooms. Machine translations solely rely on literal meanings, leading to confusion and misinterpretation. By researching the match production process, it is evident that these rooms serve the purposes of “理梗，排梗” (arranging match sticks), “沾药” (applying chemicals to match sticks), “药浆调制” (preparation of chemical formulations), and “包封” (packing) (Wei Zichun & Li Zhuofeng, 2023). Therefore, a translation approach combining literal translation with explanations is recommended, translating them into “typesetting rooms (rooms used for arranging match sticks), waxing rooms (rooms used for applying

chemicals to match sticks), mixing rooms (rooms used for preparation of chemical formulations), and packaging rooms (rooms used for packing matches)”. This translation provides readers with more information, matches the original context, enhances the connection between the original text and the translated version, and improves the readability of the translation.

#### 4. Conclusion

Through this translation practice, the author has found that machine translation can indeed play a prominent role in enhancing the output of translations to a certain extent. For example, it can effectively alleviate the pressures faced by the author in translating unfamiliar vocabulary, understanding the original text, and constructing initial sentence structures, thereby improving translation efficiency and speed. However, solely relying on machine translation comes with evident drawbacks. Errors such as mistranslation of industrial proper nouns, miscollocations of words and meaning, logical disorder, and complicated sentence structure necessitate indispensable post-editing work. Translators must address errors and issues in machine translation at the lexical and syntactic levels during post-editing, ensuring quality control in translation. Using the excerpt from *Hubei Industrial Culture and Design* as a case study, two machine translation tools, DocHero.ai and Google, are selected for a comparative analysis between machine-translated and human-edited English translations. By examining examples and identifying errors in machine translation within industrial texts, this study provides insights into machine translation, proposes targeted post-editing methods for different types of errors, and offers valuable reference for translating industrial information texts from Chinese to English.

To a large extent, machine translation tools still require further improvement, and the shortcomings need to be addressed through a combination of understanding and practical research. Based on the translation practice, the author concludes that the “machine translation + post-editing” model demonstrates strong applicability in translating industrial texts, meeting the requirements for accuracy and conciseness in industrial translation. Although machine-translated texts have shown positive effects in translating informational texts, limitations still persist. Drawing from personal practical experience, the author proposes corresponding post-editing strategies: emphasizing the handling of industrial proper nouns and culture-loaded words, ensuring the uniformity and accuracy of translated proper nouns; flexibly adapting word choices based on the context to convey accurate information; organizing the original text logic, logically splitting sentence structures to clarify the central idea of sentences for sentence correction; appropriately eliminating redundant and unnecessary information based on the original text, streamlining sentence structures; supplementing reasonably for content deficiencies caused by machine translation, considering reader acceptance, and adding background information appropriately to provide relevant experience for future similar translation practices.

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