



Comparative Research on Machine Translation and Human Translation of Examples in Dictionary from the Perspective of Skopos Theory

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Abstract. With the increase of economic, political and cultural exchanges among countries, bilingual dictionaries are indispensable for both translators and language learners. While examples, as the flesh and blood, are essential to dictionary translation because they offer detailed explanations and descriptions for the headword. In addition, machine translation (MT) has experienced many years of development since 1930s, during which the quality and speed of translation have been improved a lot. Nowadays, neural machine translation (NMT), as the state-of-art technology, is dominating online MT systems. Based on the Skopos theory proposed by Hans J. Vermeer, this thesis proposes three evaluation criteria for example translation, including practicality, faithfulness and making sense. 300 examples are selected from the *Oxford Advanced Learner's English-Chinese Dictionary* (OALECD) (4th version) and translated by Google Translate. After that, quantitative and qualitative analyses are conducted on both translated versions. As a result, human translation (HT) generally scores higher than MT. Reasons can be found in the lacking of context, incomplete meanings of headwords in corpus, and understanding of the source text.

Keywords: Dictionary Translation · Machine Translation · Human Translation · Skopos Theory

1 Introduction

As the soul of bilingual dictionaries, examples are essential for users to better understand the headwords. So it is obvious that examples should be translated in specific aims or purposes, yet no one has assessed the quality of example translation in light of the Skopos Theory proposed by Hans Vermeer.

Over decades, machine translation has achieved remarkable development and is now widely adopted in areas like instructions and scientific documents to yield socio-economic benefits. As globalization accelerates and communication in international

community increase, people now have a stronger demand for machine translation. Generally, machine translation has experienced 3 stages: rule-based machine translation (RBMT), statistics-based machine translation (SBMT) and neural machine translation (NMT). Google Neural Machine Translation launched in 2016 is so far the most advanced translation system. Undoubtedly, in some specific areas, NMT could be as accurate as human translators. Given that, this paper conducts a comparison between the quality of MT and HT in example translation. The purpose of this paper is to find evaluation criteria to assess the quality of HT and MT in example translation, with the hope of proposing ways of improvement for MT and example translation.

Theoretically, it is an application of Skopos theory in example translation. Based on previous studies on example translation and with the help of basic principles of translation quality assessment proposed in previous studies, this paper figures out three evaluation criteria for example translation. Practically, by comparing MT and HT in example translation, this paper is able to point out the discrepancies between them, and then predicts the prospect of machine translation, i.e. whether it will replace human translators in the future. Based on the selected examples from the *Oxford Advanced Learner's English-Chinese Dictionary* (OALECD) (4th version), this paper tries to answer the following questions respectively:

- 1) What assessment criteria could be used to evaluate the quality of example translation in view of Skopos Theory?
- 2) What strengths and weaknesses does MT has, as compared to HT in example translation?
- 3) Will HT be defeated by MT in the coming years? If so, what can be done to prevent that from happening?

This paper hypothesizes that by combining the three rules of Skopos theory and principles of example translation, evaluation criteria applicable to example translation could be found. Based on the analysis results, corresponding solutions to problems of example translation could be figured out, and prospects of MT could be seen.

2 Method

2.1 Features of the Source Text

The *Oxford Advanced Learner's English-Chinese Dictionary* (OALECD) (4th version) is widely recognized as an excellent reference book for advanced English learners. As the flesh and blood of a dictionary, examples are featured with variety of source texts, inadequacy of context and systematicity. Source texts of example vary greatly since dictionaries are all-embracing. And bilingual dictionaries are categorized into two kinds, namely, general and specialized ones. Different dictionaries serve for different purposes, so do examples. Since the length of examples is short, the context provided in an example is much limited than that of a general text. Generally speaking, example translation is semantics-oriented, seeking for static equivalence (Liu, 2004) [1]. Chen (2016) [2] treats the representativeness of illustrative examples as one of the evaluation criteria to assess the quality of Chinese dictionaries. Therefore, another advantage of

examples is the high level of representation, which facilitates the demonstration role of the headwords (Han, 2008) [3].

2.2 Competence of HT and MT Software

Example translators are mainly linguists, professors or experts in lexicography, who are able to bridge the gap between two cultures. In translation process, there are mainly two difficulties to be tackled. One is to find complete equivalence, in the same way as it is hard to find synonyms that have exactly the same meaning within one language. Another difficulty in translating examples is lack of context. Examples are designed to illustrate the meaning and usage of the headwords, and contexts help enhance the comprehension. As it's known to all, the meaning of a word would be difficult to specify if there's no context. Compared with other text types, examples in dictionaries are much shorter, hence the contexts are not complete. With translators' knowledge background, translation skills, language proficiency and the process of proofreading, those human-translated texts are reasonable and suitable research objects.

Google Translate, an automatic machine-translation service provider developed by Google Inc., translates one language to another directly or with English as a medium. Undoubtedly, Google Translate has been a success among all other software even though it sometimes fails to live up to users' expectation. Since its launch in 2007, Google has achieved remarkable results in the annual test of translation quality. And since 2014, as the state-of-the-art technology, NMT has become the core technology adopted by Google (Liu, 2017) [4]. Therefore, this thesis chooses Google Translate as research object.

2.3 Research Procedure

- 1) 300 headwords and their examples are selected from OALECD (4th version) by using stratified random sampling, which ensures a greater level of representation and less sampling errors. The dictionary has 2,346 pages in total, so each headword is chosen randomly at intervals of 7 pages.
- 2) These chosen examples are then translated by the software Google Translate.
- 3) A parallel corpus is then established, with the chosen headword in the first column, its definition in the second, source sentence in the third. While the human-translated texts and machine-translated are listed under the column.
- 4) Both MT and HT are analyzed under the three rules of Skopos Theory from the perspective of qualitative and quantitative analyses.

3 Theoretical Framework

3.1 Origin and Development of Skopos Theory

Skopos theory, built by Hans J. Vermeer, is part of the German functionalist translation theory. The word “Skopos” comes from Greece, in English it means “purpose”. According to the Skopos theory, translation studies should be conducted from a purposeful perspective. According to Vermeer, translation is intentional, purposeful which occurs under a given context. The aim of translation is to achieve a certain purpose or serve target audience (Vermeer, 1987) [5]. The Skopos Theory has evolved through four stages:

The Functionalist Theory is proposed by Katharina Reiss in her work *Possibilities and Limitations Translation Criticism* in 1971, she holds the equivalence theory centered by the source text, believing that each translation work aims to reach a balance between target language and source language.

Nord (1997) [6] believes that functional equivalence is to be taken into consideration first in translation, instead of meaning equivalence. Hans J. Vermeer, the student of Reiss, continued to develop this theory.

Vermeer built the Skopos Theory in the book *Groundwork for a General Theory of Translation* in 1984, where he stated that the act of translating could be seen as a human action with a unique purpose.

Based on the theory, Justa Holz-Manttari (1984) [7] defined translation as “a complex action designed to achieve a particular purpose”. The purpose is to transfer messages across culture and language barriers by means of message transmitters produced by experts.

In light of the theory, many Chinese translators or students have made comparison of different translated versions, different source texts, and proposed different evaluation criteria. But there indeed exists limitations, for example, studies on example translation in bilingual dictionaries can be hardly seen, while dictionaries are essential for translators, especially students in this field.

3.2 Three Rules of Skopos Theory

Skopos rule is of greatest significance among the three principles in the process of translation, here the purpose could be described as the communicative purpose, the purpose of translators, the purpose achieved in a certain way. This rule stipulates that the process and ways of translation are determined by the purpose of translation, so that the text could be translated in more than one way. However, this does not mean that translators are completely limited by the purpose of translation, in terms of this, Vermeer (1989:20) [8] gives a clear definition: “Each text is produced for a given purpose and should serve this purpose. In this sense, the Skopos rule reads as follows: translate/interpret/speak/write in a way that enables your text/translation to function in the situation in which it is used and with the people who want to use it and precisely in the way they want it to function.”

The coherence rule in the Skopos theory usually refers to intra-textual coherence, which makes it like a bridge between the writer and the target reader. To follow the coherence rule, the information target language conveys need to concur with the cultural

environment and communicative situation of target recipient. This rule requires that background knowledge of the target readers should be taken into account by translators, so that the translated texts are acceptable and understandable. Therefore, coherence rule can be considered as a necessary supplement of the Skopos rule.

Just as faithfulness proposed by Lu Xun, the fidelity rule in the Skopos theory holds that there be a certain equivalence between SL and TL. But fidelity rule stresses that how faithful the TL is and in what way should be in line with the its purpose and how the translator understands the text (Chen, 2016) [2].

4 Literature Review

4.1 Development of Machine Translation

The development of MT generally consists of three phases: rule-based machine translation (RBMT), statistics-based machine translation (SBMT) and neural machine translation (NMT).

In 1954, IBM-701 computer translated a few simple Russian sentences for the first time, since then, other countries had started to conduct machine translation successively.

Later, language model plays a critical part in SBMT by improving the readability and fluency of target sentences. And the analysis of the source text by MT is based on formality, syntax and semantics, so MT is not accurate enough to analyze long and complex sentences back then.

Although the idea of neural machine translation was put forward in 2013, it was not until 2016 that NMT made tremendous progress, and performed better than SBMT, hence became the core technology of commercial translation systems like Google Translate. The error rate of Google Neural Machine Translation has been reduced by more than 60%. In the translation of normative documents, the quality of Google is nearly the same of that of human translators.

Obviously, the advantages of MT lie in the fast information processing, time- and labour-saving process, which help the normalization and consistency of translation. However, due to the great dependency to corpus, the weaknesses of machine itself and the complexity of language service, MT still has a long way to go in order to reach a certain high level. This thesis manages to figure out whether there's a way to perfect the output of MT in semantic and pragmatic aspects through the application of the Skopos Theory.

4.2 Previous Studies on Example Translation in Bilingual Dictionaries

By the 19th century, the development of westernization accelerated the compilation of bilingual dictionaries by Chinese scholars. As the economy grows and international communication increases, lexicography and related studies have been heated in China. Today, the growth of corpus is also facilitating the efficiency and accuracy of computer-assisted lexicography (Wan, 2005) [9].

Liu (2004) [1] investigates illustrative examples in Chinese-English dictionaries and explores 5 major problems existing in it: 1) lack of illustrative examples; 2) improper use

of literary illustrative examples; 3) improper adoption of illustrative examples with political colors and regional or national discrimination; 4) improperly translated examples; 5) inconsistency between the part of speech of entries' explanation and the headword in its illustrative examples; 5) grammatical and format errors. Liu (2010) [10] suggests that the collection of examples ought to be typical, representative, practical, self-sufficient in meaning and up to date. Wan (2005) [9] argues that the core issue of bilingual dictionaries is to find equivalent lexical units in TL to SL, and compilers should maintain consistency in translation.

As previous studies indicated, example translation bears its special characteristics and functions, and the purpose of example translation is to achieve equivalence. However, equivalence theory has been taken as the major guiding principle, which is not enough for a comprehensive analysis of example translation. Therefore, this thesis adopts the Skopos theory as the theoretical and motivational ground for the improvement of example translation.

5 Case Study

5.1 Evaluation Criteria with the Application of Skopos Theory

According to previous studies on bilingual dictionaries, Komissarov puts forward five principles that bilingual dictionaries should follow, namely, equivalency, style, fluency, practical function and convention. While Wan (2005) [9] adds another criteria, i.e., consistency. So this paper, combining the six rules and the Skopos theory, concludes three basic evaluation criteria of example translation, which are being practical to users, being faithful to source language and making sense.

First of all, since bilingual dictionaries are instrument, the purpose of example translation should be practical, which requires translation to be specific and useful, not only conveying the literal meaning and usage, but also proving cultural and social knowledge. Second, faithfulness should be guaranteed in example translation, without modifying the meaning of the source language, thus establishing a closer relationship between target language and translation recipients. In view of eco-translatology, the translator makes adaptive choices from the perspectives of language, culture and communication, and puts the source text in a language ecological environment so that target readers may find it easier to comprehend (Long & Liu, 2022) [11]. During the translation process, understanding is the premise of reproduction of the source text, and expression is the result of understanding. Without correct understanding, there would be no correct expression. Although understanding and expression belong to different stages of translation process, both of them are subject to the constraints of context. For ambiguous sentences, translators must learn to be good at analyzing its connotation to make accurate judgments. (Long, 2019)[12] Accordingly, translated-texts should be fluent and readable to receptors, which requires translators to take the cultural background of receptors into account so as to improve readability.

Table 1. Example of Practicality (OALECD, p.1789)

Headword	Definition	ST1
Refund	repayment; reimbursement <i>tui kuǎn</i> ; <i>chánghuán jīn é</i>	He demanded a refund on the unused tickets.

Table 2. Example of Practicality (OALECD, p.1585)

Headword	Definition	ST2
personnel	people employed in one of the armed forces <i>rén yuán</i> ; <i>zhí yuán</i>	Army personnel are not allowed to leave the base.

5.2 Analysis with the Criteria of Practicality

5.2.1 Qualitative Analysis

The criteria of practicality serves as the first and foremost principle in translation quality assessment. Since the content of illustrative examples varies greatly, the purposes of those examples are various. In order to serve these purposes, translators must make sure readers understand the source language. All in all, the translator should first comprehend the source language.

HT1: *tā yàoqiú duì wèi shǐyòng zhī piào gěiyǔ tuikuǎn.*

MT1: *tā yàoqiú tuìhái wèi shǐyòng de piào.*

As can be seen in Table 1, the purpose of this sentence is to illustrate that “he” wanted for reimbursement of the unused tickets. The human-translated version successfully makes this purpose clear, while the machine-translated version literally means that “he” wanted a “return” of the unused tickets, instead of asking for reimbursement. In addition, Google Translate makes the target text more confusing. Because of the contextual limitation, SL is not able to provide enough information for translators.

HT2: *jūn shì rén yuán bú zhǔn lí kāi jī dì.*

MT2: *lù jūn rén yuán bú dé lí kāi jī dì.*

As shown in Table 2, the purpose of this sentence is to make an announcement or warning that people employed in an armed force cannot leave the base. And both human and machine translate it clearly, realizing the vocative function. However, the only different between HT and MT is that the exact type of the personnel. Human translator generalizes them as military personnel, while machine categorizes them as ground personnel. In terms of the definition of the headword, it seems better to translate them as military ones.

5.2.2 Quantitative Analysis

The qualitative study only analyzes several examples chosen from the dictionary, while in order to yield a more scientific result under this criteria, this part of analysis focus on each and every translation result with the application of the first criteria. That is to

say, each translated-text is marked as 300 points at the beginning, and each mistake causes one-point loss, which means no other than mistakes that goes against the criteria of practicality will be counted. And then the score will be divided by 300 and times 100 percent, thus getting a percentage number.

Statistics shows a clear distance between HT and MT now, under this criteria, HT almost gets full marks, while MT loses over 20% of its points. Based on both qualitative and quantitative results, HT performs better than Google in terms of practicality, while machine almost make the sentence readable, but not good enough in wording, and comprehensibility.

5.3 Analysis with the Criteria of Faithfulness

5.3.1 Qualitative Analysis

The criteria of faithfulness, which corresponds to the fidelity rule in the Skopos Theory, requires translators to build a corresponding relationship between SL and TL. Although translators are allowed to simplify, supplement, or restructure the target texts, deviation in delivering the meaning of the source text should be avoided.

HT3: *jǐng chá tū xí le tā men de cáng shēn chù.*

MT3: *jǐng chá duǒ cáng qǐ lái.*

According to Table 3, one of the definition of the word “descend” is “to attack someone or something” here. Human translators accurately translate it into Chinese, while Google Translate literally omit to translate the meaning of the headword, but misinterpret it as the police hiding themselves away. Although the translated text by Google is readable and understandable, it means exact the opposite.

HT4: *nǐ zhèng zài hē jiǔ ma.*

MT4: *nǐ zài xī shōu ma.*

According to the definition of the headword, the word “imbibe” in Table 4 means “to drink alcohol”, instead of its original meaning “to absorb”. So the sentence “Are you imbibing?” actually equals to “Are you drinking alcohol?” In the sense, human translators do a good job, while machine translation seems to adopt the original interpretation of

Table 3. Example of Faithfulness (OALECD, p.573)

Headword	Definition	ST3
descend	(phr v) descend on/upon sb/sth (a) attack sb/sth suddenly <i>xí jī</i>	The police descended on their hide-out.

Table 4. Example of Faithfulness (OALECD, p.1088)

Headword	Definition	ST4
imbibe	drink (sth, esp alcohol) <i>hē, yīn</i>	Are you imbibing?

the headword, which sounds very weird in real conversation. And the purpose of this sentence is not fulfilled since the misunderstanding of the source text.

5.3.2 Quantitative Analysis

Similarly, this part of analysis focus on all selected examples with the application of the criteria of faithfulness. Same as above, the score would be counted as a percentage number.

To some degree, HT makes more mistakes in faithfulness than in practicality, while the score of MT in these two criteria are pretty much the same. However, both qualitative and quantitative results indicate that HT performs better than Google in faithfulness. The reason can be found in the misunderstanding of SL, and definitions of headwords encoded in corpus are not complete, which provide limited choices for machine translation software.

5.4 Analysis with the Criteria of Making Sense

5.4.1 Qualitative Analysis

The criteria of making sense argues that the target texts needs to fulfill the communicative function in a smooth and fluent way. Given that the context of examples is limited, translators should at least find correct counterparts to SL, and try to fulfill the purpose of translation. Only when the translator comprehends the source text, and finds equivalence in Chinese, could translation make sense.

HT5: *wǒ men duì xīng qī liù yī bài tú dì.*

MT5: *wǒ men de tuán duì zài xīng qī liù dé dào le yī gè zhēn shí de zhān tiē.*

In Table 5, it is clear that the source example is colloquial, and the definition of the word “paste” here means “to severe beating”, which is an informal usage of the word. The purpose of the translation is to deliver the actual meaning of the headword, and human translators has done an excellent job, but what machine has translated is beyond understanding. Google not fails to understand the informal meaning of the headword, but also makes many grammatical mistakes, since “*dé dào le yī gè zhēn shí de zhān tiē*” does not make any sense in Chinese.

HT6: *tā yī zhí shēng bìng, dàn xiàn zài yòu zhòng xīn cān jiā huó dòng le.*

MT6: *tā bìng le, dàn xiàn zài yòu huī fù le liú tōng.*

In the example cited in Table 6, the purposes are two-fold. The first one is to illustrate that “she” has been ill, the second one is to stress that she’s recovered from illness and back to socialize. The definition of the headword “circulation” is that someone or something passes from one person or place to another. And based on the purpose

Table 5. Example of Making Sense (OALECD, p.1556)

Headword	Definition	ST5
paste	pasting (infml.) severe beating; defeat <i>hěn zòu; dǎ bài</i>	Our team got/took a real pasting on Saturday.

Table 6. Example of Making Sense (OALECD, p.365)

Headword	Definition	ST6
circulation	passing of sth from one person or place to another; spread <i>liú chuán; chuán bō</i>	She's been ill but now she's back in circulation.

of the translation, it is clear that here the subject of “circulation” refers to a person, instead of something else. Although human translators do not use the word “*chuánbō*” or “*liúchuán*”, they adopt a verb phrase to express the actual meaning, which is more suitable for Chinese readers’ language background, thus improving the readability of the target text. In this sense, Google seems to choose the original meaning of the word, which causes a mismatch between the subject “she” and the verb “circulation” in Chinese.

5.4.2 Quantitative Analysis

As it is conducted above, this part of analysis emphasizes on all chosen examples with the application of the criteria of making sense only. Like coherence in the Skopos Theory, fluency and readability also play an unique role in assessing translation quality. Certainly, the score would also be counted as a percentage.

According to the result, it is obvious that in terms of this criteria, HT scores much higher on the average. Based on both qualitative and quantitative results, HT performs better than Google in making sense. Part of the reason is that the mother tongue of human translators is Chinese. Compared to machine translation software, whose foundation is statistics. Human translators find it much easier to make the translated text more fluent and native.

6 Findings

Language is a bridge for interpersonal connection, spanning cultures and subcultures across different countries and continents. Nowadays, foreign language education in China has entered a new era, with new ideas emerging one after another. Foreign language deep education is a brand-new educational mindset. The idea to promote the education in translation and cultivate professional language service provider in modern times is exactly in line with the idea of deep education.(Long, 2019)[13] By conducting this research, the author gets a clear and obvious result of how large the distance is between MT and HT. With the Skopos Theory as the basis, and with the special characteristics of the source text, three criteria are tailored for example translation.

Specifically, examples in bilingual dictionaries have such features as lack of context, sometimes colloquial, and with a specific purpose which is set by the meaning of the headword. Faithfulness, similar as the fidelity rule in the Skopos Theory, is given priority. As previous studies suggest, illustrative translation, or example translation is semantics-oriented, which emphasizes the equivalence to SL. Practicality, though less important than faithfulness, is set up based on the Skopos rule, whether the purpose

of translation could be realized or not depends largely on this criteria. Polysemy is a remarkable feature of English, so it's critical to recognize the connotation of an English word first. Lastly, making sense, also known as readability, is the third criteria. This criteria could be seen as the extension of the coherence rule. However, due to the limited length of examples in dictionaries, readability seems more reasonable to assess example translation.

Although the Skopos Theory has gone through so many years of development, it is not adaptable for all types of text, so it is necessary to adjust the rules when we assess different texts. The criteria of practicality, faithfulness and making sense proposed in this paper make it possible to make comparison between MT and HT. According to the result, machine translation software like Google are now able to deliver literal translation, especially when translating short vocative sentence. But based on the other two criteria, it is clear that there are still many problems in MT, so it is impossible for MT to replace HT in the near future.

7 Limitations

The limitation lies in that the previous studies on Skopos theory are already a lot, so there are not much room left for the author to conduct further study on this theory. On the other hand, studies on dictionary translation are not updated enough, most of them were done in the beginning of the 21st century, and there is only a few research on example translation. Another difficulty for this maiden attempt study lies in conducting research on all examples in the dictionary due to the huge amount of examples.

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