

A Satisfaction Survey on the Human Translation Outcomes and Machine Translation Post-Editing Outcomes

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Abstract

This cross-sectional survey research carried out with the inquisitive agenda on satisfaction of the translation outcomes as performed by human translation and (machine translation) post-editing. The survey group consisted of 166 Korean translators primarily working with the English, Chinese, and Japanese languages. They were asked to rate the satisfactory level with accuracy, fluency, idiomatic expression, and terminology in the Richter's scale of four. The result reveals that human translation is more satisfactory than post-editing with respect to accuracy, but it is uneasy to assert that accuracy is unsatisfactory in post-editing. On the other hand, the Korean translators are less satisfied with fluency, idiomatic expression, and terminology than accuracy. It can be assumed that although human translation is more satisfactory than post-editing, the accuracy of post-editing seems to be more acknowledged than fluency, idiomatic expression, and terminology, which lead the translators to take the accuracy of raw machine-translation products and to go on to improve the fluency, idiomatic expression, and terminology. Nevertheless, Korean translators believe Korean idiomatic expressions cannot be satisfactorily produced in post-editing, while fluency and terminology can be improved in post-editing.

Keywords: human translation, post-editing, machine translation, accuracy, fluency, idiomatic expression, terminology

1. Introduction

The technological advancement of artificial intelligence (AI) and deep learning has recently upgraded the quality of machine translation at a faster rate and in a shorter period [1]. Editing the raw outputs after machine translation (machine translation post-editing: MTPE) has loomed large as a more feasible method to acquire the intended translation [2], [3], [4], [5], [6]. Machine translation made possible to translation a large amount of data at a short period of time at a relatively lower cost. The quality of its outcome cannot be tantamount to the quality of human translation, but quite comprehensible. Acting in concert with the changing paradigm of translation, translators having performed with the conventional method of human translation came to a gridlock. The one specific reason is that the quality of human translation varies among different translators and among

the translators' works in history. The same translator may not use the same vocabulary and employ the same level of translation style. It means, quality consistency cannot be warranted, which can be the primary reason to opt for machine translation and post-editing. Translation from bare scratch by means of word-processing and multilingual dictionaries—once an area for linguistically quite-advanced and culturally well-accustomed translators—is losing its commercial value rather rapidly. A greater number of language service providers and private and public institutions, for example, in Europe and the U.S. have adopted MTPE, while doing away with human translation. Computer-assisted translation (CAT) tools like the translation platform are used as linked, mostly, to Google Translate via API (Application Program Interface). A well-known CAT tool that a great number of language service providers and translators in Europe and the U.S. use is called Trados.

So has been in Korea [7]. The present transition period undergoes an essential change in the method of translation. A Korea-based IT company named Evertran Inc. has been developing a more advanced, versatile CAT tool called VisualTran. This tool is linked to several API's such as Google Translate, Microsoft Bing, NAVER Papago of Korea, etc. and suggest candidate machine-translation outcomes which post-editors compares, selects, and edits for the optimal outcome. For it, this article attempts to examine the perceptual similarities and differences in the satisfaction of end-products in terms of accuracy and fluency between the two methods of translation: human translation and MTPE. Accuracy refers to the adequate, acceptable level of translated texts (TT) with respect to source texts (ST). Fluency refers to the comprehensible, readable level of TT.

Studies report the usability of TT from raw machine translation without needing MTPE [8], [9] for some language pairs like English and French [1], especially more so when the goal of translation aims at the fitness for purpose. Nevertheless, translation industries as well as, assumedly, translators themselves have promptly turned toward MTPE as the standard method of translation [10]. Again, so has been in Korea [7], [11]. Cost can be an important factor, but the turning point is that previously-used ST and TT stored in translation memory improves the quality of future MTPE as generating structures of TT and terminologies in TT used in the previous translation. Current translators, often well-experienced and not young, have been trained for human translation, and have performed with time-and-energy-consuming human translation. Many reasons may arise for them for having not turned to MTPE. Doubt on the once-awful quality of machine translation can be one. Over-credulity for human translation over machine translation can also be a case. Illiteracy on the cutting-edge translation-aided software and technologies is also a crucial factor. Whatever the reasons can be, translators are not prepared to carry out the translation task with MTPE. [12] mentions that Korean translators perceive fear toward the changing concept of translation with the advent of machine translation. [13] informs that the conventional Korean translators face difficulties embracing the rapid changes in the method of translation. Nevertheless, these translators carry out MTPE as almost all translation service providers in Korea have already adopted MTPE as the sole method of institutional translation. The satisfactory level of the end-products of MTPE carried out by those conventional translators can be an inquisitive issue. Would they be more satisfied with MTPE, the modern method of translation, or with human translation, the usual method that they are quite accustomed to? In essence, previous studies related the present topic do not seem to have taken place; hence, related studies are discussed in the following section.

2. Related studies

[7] analyzes interpretation and translation services of top 20 global language service providers. Her study characterizes how the innovative language technology represented by the computer-aided translation and crowd-sourcing translation platforms, which have recently become hot topics in translation studies, has changed translation stakeholders, translation methods, and translation participants. For machine translation

to be effective and efficient, it suggests the use of controlled language and post-editing. Translators need to manage and rely on translation memory. In other words, glossary and translation memory must be constructed and customized to machine-translation users to the greatest degree.

[14] investigate the typology of machine-translation errors through post-editing measurement indicators. Although machine translation can process a large amount of translation in a short time, it has yet reached the quality of human translation. Eight students in the 4th semester of the Graduate School of Interpretation and Translation were evaluated for errors on a total of eight types, including the results translated by human translators. Regardless of text types, errors in clarity occurred in almost all sentences. Even sentences that had no problem in conveying meaning on the surface frequently had unnatural fluency and ambiguity errors in the destination language.

[8] assigns translation tasks to five areas and reports that translation work can be expanded further with the help of machines in many areas. She therefore assumes that if the translators with the traditional concept do not try to adapt to the new era of artificial intelligence, they will inevitably be left behind. She further emphasizes that translation tasks can become more productive and creative work with the help of machines. Furthermore, translators participating in these works are being asked not only for their ability to translate according to the present times, but also for more skills that were not required previously. From this point of view, it is necessary to re-establish the concept of the profession as a translator, which has been markedly different from the past. To cultivate translators suitable for it, it is necessary to carry out more research about the perceptions of existing translators who feel this situation with their skin on the front line.

[15] mentions that MTPE is a skill that is honed only after investing a certain amount of time and accumulating experiences, and the analysis of the MTPE curriculum is meaningful because it is a process that is gradually improved through sufficient practice. What is interesting to her is that she also considered the possibilities of translation and language learning through MTPE. It is very remarkable that she agrees quite a bit with the possibility of language learning with MTPE and considers it important to prepare post-editing guidelines. She further comments that with the shift from human translation to MTPE method, a much larger scale of translation could be done by multiple translators at the same time. In addition, she adds that a comparative analysis of the behaviors and perceptions a translator undergoes when performing human translation and MTPE will be of great help in preparing post-editing guidelines.

[16] examines a phenomenological study on the post-editing of Google machine-translation with undergraduate translation majors as participants who have experienced MTPE. He reports the kind of perception they have in relation to MTPE. They were asked to use only free machine-translation engines such as Google Translate to modify the machine-translation outcomes produced at the spot. Participants commonly experienced that MTPE was difficult to process terminologies, MTPE is difficult to correct and edit, professional MTPE training is required, the quality of machine translation was not flawed than expected, and it is necessary to accept machine translation. Yes, pre-editing is necessary to improve the quality of machine translation, and MTPE capabilities have a deep relationship with translation capabilities.

In addition, from [16], the machine-translation outcomes still lack the quality of terminology in several areas, due possibly to the fact that enough data has not yet been entered for the necessary machine-translation programs for deep learning. The editing of MTPE was reported to be difficult because of poor readability of the machine-translation outcomes and poor comprehensibility of source text with the machine-translation program. The participants still conceived the necessity to accept machine translation in the transitional period of translation paradigm. It seems like an insightful perception that some causes of poor quality of machine-translation outcomes were recognized due to the poor quality of source text.

Daems and his colleagues [2] ask whether there is a difference in the method of performing the post-editing

process compared to the human-translation method that translators translate from the scratch, as our study attempts to do so. There is evidence that MTPE is slightly faster than human translation [6], although not always noticeable in other previous studies comparing human translation to MTPE. It was previously known that MTPE was faster than human translation in technical texts [17], but a study by [2] shows that MTPE is statistically significantly faster even for general text types. The results were derived. Due to the prompt development of machine-translation technologies, MTPE seems to be taking over the human-translation domain at a rapid pace, not only in specialized fields where terminology is relatively easy to organize, but also in general fields. While dividing human translation and post-editing according to translation process and translation outcomes, Daems and his colleagues [18] examine for any difference between these two methods in the response of translators. While our study investigates to understand the perceptions of translators through a questionnaire survey, whereas Daems and his colleagues carry out more objective and scientific experiments such as key stroking and eye tracking.

[19] compares human translation to the matching of MTPE and translation memory and found that MTPE is cognitively less burdensome than human translation. Likewise, translators are expected to recognize that MTPE is less labor-intensive than human translation. This is because, due to the nature of machine translation, machine translation more smoothly resolves the overlapping parts of many terminologies in large data and produces more proper outcomes.

For the final product of the two translation methods, human translation and MTPE, [3] also find out that MTPE sentences are usually of a higher quality than sentences translated by human translation. In addition, [6] achieves similar results. It is reported that texts with MTPE score higher than texts translated by human translation.

It is important that the translator feels satisfied with the performance of his or her work, even if the MTPE works faster without compromising the quality of translation. However, [20] writes that although professional translators are generally skeptical of machine translation, learning how to use machine translation is meaningful. In a survey conducted by [21], the attitudes of translators toward machine translation are somewhat mixed. Meanwhile, in other studies, MTPE is recognized as taking more effort and time than human translation, and participants preferred human translation to MTPE [22]. This mixed result is presumed to be a possible result because the field of translation is broad and the quality of source text is diverse. In order to obtain objective research results, it seems that it is necessary to create certain conditions and environments and conduct experiments at certain intervals of time and space.

The above studies show unique findings on human translation and MTPE. However, the data that compare the differences in satisfaction with accuracy and fluency of the outcomes with respect to the two methods can provide addition information to better understand the modern translators, but none of those exist. In addition, it can be interesting to examine the translation satisfaction with terminologies and idioms.

With these research agendas, our study aims to collect and analyze a large amount of data by conducting a questionnaire survey targeting Korean translators who work with the translation from and to English, Chinese, and Japanese.

3. Survey research

3.1 Method

The purpose of this study is to find out the satisfaction Korean translators perceive on the translation outcomes by human translation and machine translation post-editing (MTPE), and to compare whether there is a difference in satisfaction of the two translation methods. The cross-sectional survey method was chosen

as the research method. A quantitative research was conducted that took the form of a questionnaire in which sufficient data could be obtained in a short time [23]. This study is part of a large-scale survey research conducted on translators participating in the AI translation project in the 2020 Korean New Deal Project.

3.2 Survey questionnaire

The following questions were asked about the satisfaction level of translation outcomes for ‘accuracy and adequacy’, ‘fluency and readability’, ‘idiomaticity’, and ‘terminology’. The questionnaires were concise and clear, after having been revised several times to enhance the comprehensibility of each questionnaire. The terms used in the questionnaire were levelled off. Terminologies were used in the questionnaire, but the meanings were expressed in the questionnaire. The participant group responded to the survey on their mobile phones or PC in a self-reporting format. The contents of the questionnaire were as follows.¹

Questionnaires about accuracy and adequacy: 4 scales

1. How satisfied are you with the ‘accuracy and adequacy’ of the human-translation outcome?
2. How satisfied are you with the ‘accuracy and adequacy’ of the post-editing outcome?

Questionnaires about fluency and readability: 4 scales

3. How satisfied are you with the ‘fluency and readability’ of the human-translation outcome?
4. How satisfied are you with the ‘fluency and readability’ of the post-editing outcome?

Questionnaires about ‘post-editing’: 4 scales

5. How satisfied are you with the ‘post-editing’ of the human-translation outcome?
6. How satisfied are you with the ‘post-editing’ of the post-editing outcome?

Questionnaires about terminology: 4 scales

7. How satisfied are you with the ‘terminology’ of the human-translation outcome?
8. How satisfied are you with the ‘terminology’ of the post-editing outcome?

The starting part of the questionnaire provided information about the questionnaire and a brief explanation of terms. Then, the ‘personal information’ section was followed to roughly grasp the participant characteristics (age, gender, degree, major, etc.) of the survey group. The survey group was asked each question to be answered on the Richter’s scale with four levels of ‘very satisfied’, ‘somewhat satisfied’, ‘somewhat dissatisfied’, and ‘very dissatisfied’.

3.3 Survey group

The survey group of translators was experienced with both human translation and post-editing, although there were some individual differences. As of October 2020, the group was composed of undergraduate and graduate students who were working as post editors or have experienced post-editing in practice. In order to secure a sufficient number of participants, professional translators, amateur translators, and even student translators were included. The survey group did not limit the translation language, field, age, gender, educational background, nationality, or expertise. A total of 199 responses were collected, but a total of 172

¹ A reviewer asked for providing the texts used in the survey. This paper, however, examined the participants’ experiences on human translation and post-editing and how satisfied they were in terms of accuracy (and adequacy), fluency (and readability), and terminologies when they had translated as human translators and as post-editors. This paper was not a sort of judgement experiment in which the participants rated as examining the texts translated by human translators and post-editors. We sincerely thank the reviewer for many great remarks on the paper.

remained, after excluding incomplete responses. Among them, only 166 questionnaires were sorted out for statistical analysis, except for 6 questionnaires that omitted one or two questions.

Table 1. Group information (a total of 166 participants)

sex	Female: 118			Male: 48	
age	20s: 68	30s: 62	40s: 22	50s: 10	60s: 4
translation experience	< 1 year 43	1 – 2 years 26	2 – 5 years 59	> 5 years 38	
major	language 90	economics/social science 40	science and engineering 19	arts 10	humanities 7
education	bachelor 108	masters 33	Ph.D. 4	others 21	

Table 1 summarizes the composition of the survey group by characteristics. The number of female and male is 118 and 48, respectively. Looking at the age group, there are 68 people in their 20's (68 people), 30's (62 people), 40's (22 people), 50's (10 people), and 60's (4 people). When looking at the period of immersion in translation, 74% of them were immersed in translation for more than one year (123 people). Among them, about 58% of those who immersed themselves in translation for more than two years (97 people), which is the period of proficiency in translation. By major, linguistics-related majors accounted for 54% (90 people), followed by economics/social science majors at 24% (40 people), and science and engineering majors at 11% (19 people), etc.

4. Statistical results

This translation method was set to two parameters (human translation, post-editing) as independent variables. 'Satisfaction with the accuracy of the translation result', which consists of four scales, was used as a dependent variable. And after setting four parameters, the relationship between them was identified. By removing the 3rd scale ('don't know'), it was not possible to make an undirected choice (i.e., forced decision). This is to determine whether there is a relationship between the independent variable and the dependent variable. The statistical analysis method suitable for this test, Pearson's Chi-Square Test (χ^2), was introduced in a non-parametric technique [24]. The statistical results calculated as 'human translation' N=66, 'post-editing' N=66, degree of freedom=3, and significance level, $\alpha=.05$ were as follows. In the following chapter, the post-editing method for each participant and the characteristics of the work process are examined.

4.1 'translation method' and 'accuracy satisfaction'

Table 2. The result of chi-square test (χ^2) for 'accuracy satisfaction' between 'human translation' and 'post-editing'

	1. 'very dissatisfied'	2. 'somewhat dissatisfied'	3. 'somewhat satisfied'	4. 'very satisfied'	total
'human translation'	0 0.500 0.500	24 29.500 1.025	110 112.500 0.056	32 23.500 3.074	166
'post-editing'	1 0.500 0.500	35 29.500 1.025	115 112.500 0.056	15 23.500 3.074	166
total	1	59	225	47	332

$\chi^2=9.310895, p=.025$

In Table 2, since the significance probability ($p=.025$) is less than 0.05, the result shows that there is a difference in the ‘accuracy satisfaction’ between the human translation outcome and the post-editing outcome. ‘Somewhat satisfied’ is similar mostly in both ‘human translation’ (N=110) and ‘post-editing’ (N=115). The difference lies in ‘somewhat dissatisfied’ with ‘human translation’ (N=24) and ‘post editing’ (N=35). Also, for ‘very satisfied’, ‘human translation’ is N=32 and ‘post-editing’ is N=15. In other words, both ‘human translation’ and ‘post-editing’ are generally satisfactory, but a closer look reveals that translators tend to be more dissatisfied with ‘post-editing’ than ‘human translation’ for the accuracy of the translation outcome. However, although the significance probability ($p=.025$) is the result of the current sample group, if the number of samples increases, it may become larger than the significance ($p =.05$), so the correlation between ‘translation method’ and ‘accuracy satisfaction’ will eventually fade.

4.2 ‘translation method’ and ‘fluency satisfaction’

Table 3. The result of chi-square test (χ^2) for ‘fluency satisfaction’ between ‘human translation’ and ‘post-editing’

	1. ‘very dissatisfied’	2. ‘somewhat dissatisfied’	3. ‘somewhat satisfied’	4. ‘very satisfied’	total
‘human translation’	0 1.000	26 44.500 7.691	94 90.000 0.178	46 30.500 7.877	166
‘post-editing’	2 1.000	63 44.500 7.691	86 90.000 0.178	15 30.500 7.877	166
total	2	89	180	61	332

$\chi^2=33.49168, p=.000$

In Table 3, the significance probability ($p=.000$) is less than 0.05. Therefore, the result is that there is a difference in the ‘fluency satisfaction’ between ‘human translation’ and ‘post-editing’ outcomes. In other words, ‘fluency satisfaction’ is higher for ‘human translation’ outcomes than for ‘post-editing’ outcomes. Regarding the fluency of the ‘human translation’ outcomes, ‘somewhat satisfied’ (94 people) and ‘very satisfied’ (46 people), that is, 84% (140 out of N=166) answered that they were satisfied. For ‘post-editing’ outcomes, ‘somewhat satisfied’ (N=86) and ‘very satisfied’ (N=15); that is, 63% (101 out of N=166) of the outcomes, reflect the category of satisfaction. As a result of binomial analysis based on these figures, both the ‘human translation’ outcomes and the ‘post-editing’ outcomes reveal that fluency satisfaction was statistically significant ($p=.000$). This is, fluency satisfaction for ‘human translation’ increases as the sample size increases. However, it can be assumed that ‘fluency satisfaction’ for ‘post-editing’ is not necessarily so.

4.3 'translation method' and 'idiomatic-expression satisfaction'

Table 4. The result of chi-square test (χ^2) for 'idiomatic-expression satisfaction' between 'human translation' and 'post-editing'

	1. 'very dissatisfied'	2. 'somewhat dissatisfied'	3. 'somewhat satisfied'	4. 'very satisfied'	total
'human translation'	1 6.000 4.167	31 49.500 6.914	94 85.000 0.953	40 25.500 8.245	166
'post-editing'	11 6.000 4.167	68 49.500 6.914	76 85.000 0.953	11 25.500 8.245	166
total	12	99	170	51	332

$$\chi^2=40.55769, p=.000$$

In Table 4, since the significance probability ($p=.000$) is less than 0.05, the result is that there is a difference in 'idiomatic-expression satisfaction' between 'human translation' and 'post-editing' outcomes. That is, 'idiomatic expression satisfaction' for the 'human translation' outcomes is higher than the 'post-editing' outcomes. As for the idiomatic expression of the 'human translation' outcome, 'somewhat satisfied' (N=94) and 'very satisfied' (N=40), that is, 81% (N=134) answered that they were satisfied. As for the 'post-editing' outcome, 'somewhat satisfied' (N=76) and 'very satisfied' (N=11), that is, 52% (N=87) answered that they were satisfied. While the idiomatic expression for the 'human translation' outcome ($p=.000$) is satisfied, it can be predicted that it is not necessarily so with the idiomatic expression ($p=.294$) for the 'post-editing' outcome. As in the result of 'fluency satisfaction', the group is divided into a group that satisfies the post-editing 'idiomatic expression' and a group that is dissatisfied. Looking at the significance probability ($p=.000$), it can be assumed that that 'idiomatic expression satisfaction' for 'human translation' is maintained even if the number of samples increases, but 'idiomatic expression satisfaction' for 'post-editing' is not necessarily so.

4.4 'translation method' and 'terminology satisfaction'

Table 5. The result of chi-square test (χ^2) for 'terminology satisfaction' between 'human translation' and 'post-editing'

	1. 'very dissatisfied'	2. 'somewhat dissatisfied'	3. 'somewhat satisfied'	4. 'very satisfied'	total
'human translation'	2 6.500 3.115	31 39.000 1.641	97 95.500 0.024	36 25.000 4.840	166
'post-editing'	11 6.500 3.115	47 39.000 1.641	94 95.500 0.024	14 25.000 4.840	166
total	13	78	191	50	332

$$\chi^2=19.23994, p=.000$$

In Table 5, since the significance probability ($p=.000$) is less than 0.05, it was shown that there is a difference in 'terminology satisfaction' between 'human translation' outcomes and 'post-editing' outcomes. That is, 'terminology satisfaction' for the 'human translation' outcome is higher than the 'post-editing'

outcome. As for the terminology of the ‘human translation’ outcome, ‘somewhat satisfied’ (N=97) and ‘very satisfied’ (N=36), that is, 80% (N=133) answered that they were satisfied, and the ‘post-editing’ outcome was ‘somewhat satisfied’ (N=94) and ‘very satisfied’ (N=14), that is, 67.5% (N=108) answered that they were satisfied. As a result of the binomial analysis, satisfaction with the terminology for the ‘post-editing’ outcome would increase as the sample size increases ($p=.000$). Looking at the significance probability ($p=.000$), it can be said that ‘terminology satisfaction’ for ‘human translation’ is maintained even if the number of samples increases, but ‘terminology satisfaction’ for ‘post-editing’ is not necessarily so.

5. Discussion

Entering the 21st century, hardware and software related technologies have developed, and the existing human translation is now increasingly dependent on machine translation. As a result, the paradigm of translation is also changing rapidly [1], [3], [5], [6], [7]. Such a collaborative relationship between humans and machines is naturally expected (Turner 2016). In Korea, so-called ‘post-editing’, in which humans post-edit raw translations by machines, has become a reality, and a new genre of translation studies has been created. The common opinion from the domestic research is that machine translation is not yet perfect but performing translation tasks with the help of a machine is an undeniable future direction [8], [13], [14], [15].

However, it is the translator who will be directly affected by this paradigm shift in the translation work. Those who specialize in human translation are now in a situation where they must perform translation works as post-editors as well. I believe it is meaningful to investigate the satisfaction on human translation and post-editing outcomes at the present period. Based on this agenda, this study investigated the accuracy and adequacy, fluency and readability, idiomatic expression, and terminology satisfaction with the outcomes by the two translation methods. As part of the 2020 Korean New Deal Project, a cross-sectional survey was conducted for Korean translators participating in the AI translation project. Statistical analysis was performed on the 116 valid questionnaire responses based on the above agenda.

The following is the definition of the survey results that those 166 Korean translators responded to. Although the existing ‘human translation’ method is more satisfied with ‘accuracy’ than the ‘post-editing’ method, the outcome obtained by the ‘post-editing’ method is also satisfactory. By analogy based on the statistical results, it is judged that (1) the satisfaction for the post-editing method can be increased as the number of sample groups increases. (2) However, the ‘fluency’, ‘idiomatic expression’, and ‘terminology’ of the outcomes obtained through ‘post-editing’ are not satisfied. Based on this discussion, the Korean translators participating in the AI translation project are somewhat satisfied with the translation obtained through ‘post-editing’ but believe that revision work is necessary to create a better translation. The sample size in this study was 166. However, as the sample size increases, the satisfaction of ‘accuracy’, ‘fluency’, and ‘terminology’ of ‘post-editing’ outcome can be increased, showing a statistically significant result ($p=.000$). However, in terms of satisfaction of ‘idiomatic expression’, it was found that the group dissatisfied with ‘post-editing’ outcome was statistically supported ($p=.294$).

To conclude. This study is a part of a large-scale research study and has limitations in analyzing and reporting the whole, but it is significant in several aspects. First, as a study to judge human cognition, cross-sectional qualitative research was conducted based on various ages, majors, careers, and translation languages. This is a rare case of satisfaction studies on ‘human translation’ and ‘post-editing’ outcomes from Korean translators in this era. Second, the translation outcomes were analyzed by subdividing them into ‘accuracy’, ‘fluency’, ‘idiomatic expression’, and ‘terminology’ satisfaction. This has created a case study that can microscopically identify where cognitive difficulties arise in the translator’s post-editing situation. Based on the prediction that satisfaction with ‘idiomatic expression’ of the post-editing outcome in this study will always

be low, this problem can be solved by building an idiomatic expression corpus of the corresponding language and loading a translation model with deep learning. It can be said that the findings of this study are very meaningful in the modern translation studies.

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