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# Cross-Cultural Translation Studies in the Context of Artificial Intelligence: Challenges and Response

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**Abstract**

The rapid development in Artificial Intelligence translation could be one of the remarkable developments in the 21st century. The ongoing studies in Natural Language Processing and the prevalence of AI translation in various industries have expanded communication reach, which is evidence that the world is in a state of convergence. It can be a subject of interest if AI translation can cause setbacks on translation studies, a multi-subject discipline with established theories, principles, issues, and trends that continue to mark its relevance even in an era that is proliferated by technology.

**Keywords:** Artificial Intelligence; Cross-Cultural Translation; Translation Studies

## Introduction

From becoming a booming trend in the early 2000s to one of the ubiquitous methods under Industry 4.0, artificial intelligence (AI) has been essential in expediting processes and expanding communication reach in various industries. Foreign investors looking into expanding business are no longer held back by the barriers in language, nor were they derailed by the need to study a different language to communicate as automated translation can easily provide basic interpretation for information needed for the business exchange. Moreover, AI translation is no longer limited to the general translation of a language, but AI translations have expanded to serve specific industries like medical, e-commerce institutions, military, legal, and financial, among others. This can be done by using specific training data from a domain, just as in the case of machine translation (MT) for the legal field. Legal jargon, phrases, contextual terms, and the like are pooled into corpora, which in turn, will become a collection for the MT system to serve as a reference (Madhavan, 2019). Smart technologies have also been pervasive even in the education circle, and artificial intelligence is used in solving problems usually left for humans to deal with; staying true to Mc McCarthy's (Pokrivcakova, 2019) words that "the study (of artificial intelligence) is to proceed based on the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it." As far as expanding communication is concerned, artificial intelligence, considered an emerging trend in studying the foreign language since the 1980s, is now capable of multilingual translation. This is possible with the development of Natural Language Processing (NLP), a subfield of AI, has been an important part of the promotion of Computer Assisted Language Learning (CALL), which now is being referred to as Intelligent Computer Assisted Language Learning or ICALL apparently with the presence of artificial intelligence. Intelligent Tutoring System which students initially used to learn in isolation, is now replaced by learning networks that allow for a more connected social environment among learners, giving rise to Massive Online Open Course (MOOC) that is used by popular sites like Khan Academy, Coursera, EdX, Canvass among others. The presence of AI in language education is deemed to have a vast im-

pact indeed (Kannan, J., & Munday, 2018). Nowadays, AI translation is significantly more in demand in social circles as various social platforms have primarily influenced people's lives. NLP is useful in mitigating language barriers by providing language translation which makes people understand and be further interested in following each other's lives despite the differences in language.

On the other hand, the study of translation has turned out to be one of the thriving fields in language study. Ever since James Holmes provided a framework and historiography for this discipline, it has not lost its relevance even to modern-day translation works. If anything, it has laid down further developments in the field, including the use of linguistic-based theories of translation, process-oriented research, approaches that are inclined to descriptive system and reception, functionalist approaches to translation, culturally-oriented research, and gender-based approaches to translation, and corpus translation studies paradigm (Naudé, J. A., 2002). Throughout this year, translation studies (TS), first and foremost, as a cross-cultural communication activity (under which languages, objects, or cultures are only secondary), has paved the way for new outlooks that would benefit various disciplines from the world over. Experts state that translation studies can be viewed as a meta discipline that can accommodate other disciplines and their theories and framework to understand other facets included in the translation process like linguistic, cultural studies, literary studies, and the like. This impresses the concept that the process of translation is a multi-faceted activity with so much room for other views, according to Ulrick and Bosinelli; Hatim; and Snell-Hornby, as cited in El-dali (El-dali, H. M., 2010).

Having various disciplines associated with translation studies, it is therefore imminent that artificial intelligence will find its way to become a subject in cross-cultural language translation. Thus, making computational linguistics become one subject associated with translation studies. Computational linguistics deals with the study of language as a system of symbols used in artificial intelligence research. It covers a computer simulation of an AI system with some internal representation of meaning to understand language (Penn, G., 2006). A well-known concept under AI, natural language processing (NLP), can be referred to as the automatic (or semi-automatic) managing of human language, and it is dedicated to helping people understand the text and receive invaluable insights (Copestake, A., 2008). The development of artificial intelligent programs for language translation is growing exponentially, with a neural machine translation of language offering more precise interpretation as unlike statistical machine translation, which interprets sentence fragments, neural machine translation translates complete sentences. Such development promises significant improvement in many industries in well-developed countries and developing nations (Hanson, V. L., 2019). With all these developments in AI translation permeating the business, tourism, healthcare, legal, and even educational industries, it can be interesting to find out what *challenges does it pose to cross-cultural translation studies, particularly with the continuous research in NLP and the pervasiveness of AI translation in various industries, and what answers can be drawn that would guarantee the relevance of translation studies* in an era that is dominated by technology.

**Materials and Methods**

This paper reviews published articles, documents, and textbooks that discuss cross-cultural translation studies and artificial intelligence in language translation. Forty-three resources that contain information on the given subject were selected and analyzed to give light to what seemingly could be challenges posed by the proliferation of AI translation and the responses that would retain translation studies' relevance as a disciplinal study.

**Discussion**

Artificial intelligence translation has been among the in-demand advancements in technology, particularly at the onset of the new millennium with the proliferation of digital gadgets and the information superhighway. Among the reasons attributed to the strong presence of AI translation is the *continuous development in NLP* and the *impact of AI translation in various industries.*

***Challenges Posed by Artificial Intelligence Translation***

As illustrated by Massardi and van der Meer in the 2017 TAUS Industry Summit, the present landscape of translation technology is marked by convergence. The industry focus of AI translation has gone from documents to software, to sim ship, to integration in enterprise systems, and now, to embedded in every application. As to the type of content the transition has been from paper in the 1980's to personalized which is the current trend. It is also evident that the number of languages being translated has increased. In the early millennium, one (1) language is being translated to around forty (40), whereas by 2020, there can be around sixty (60) languages with sixty (60) translations. This augmented development in the number of languages translated took place in twenty (20) years. By 2030, it is predicted that there will be 150 languages translated to 150 other languages because of automated translation (Massardi et al., 2017). The demand for real-time customized translation in a web-crawled internet of things has been evidence of rapid growth. Machine learning and translation that features Deep Learning with several symbols of variables called neural networks is a relatively new way that is widely used in different machine learning applications. This has the capability o function unsupervised and still yield accurate translation and better performance (Singh, 2017). Being a forerunner in the pervasiveness of AI translation, it has been found to perform best compared to 18 other translation pairs and contains the features commonly used in the field. This was proven using test suites that focus on particular language phenomena like word-sense, disambiguation, and document-level coherence, also known as terminological correctness. It is even perceived to have human translation quality in certain language pairs like German to English (and vice versa) and English to Russian (Bertoldi et al., 2018).. What made this neural translation machine technology very popular is producing ready-to-use and high-quality translations via post-editing. This is commonly deployed generically like that of Google Translate or customized like the MT@EC engine used for policy documents. Another interesting fact about these modern machine translators is adapting to the context in real-time and learning from and evolving through user interaction.

Furthermore, it aims to increase the machine's output utility in a professional environment. A modern MT's memory works by keeping in sync with the user's translation memory, and as it receives a prompt for translation, the system immediately analyzes its context, recalls the closest translation examples from its domain, and instantly adjusts its neural network to the prompt. As far as performance is concerned, MT's adaptation can deliver customized translation quality at a cost comparable to generic translation, and because of optimization, translating a sentence is said to run for a fraction of a second (Barrault, L. et al., 2019).

The challenges posed by the developments in artificial intelligence are almost always perceived as a threat to the human labor force, including that of translators. Another possible hurdle set forth by AI translation to translation studies is the impact of AI translation in various industries where the translation is essential. For example, in the field of tourism and hospitality, AI-controlled chatbots have served important functions in activities commonly assigned to individuals like customer services, decision-making support, and online community building aside from retail and modernized payment systems. Customer service travel bots, the most common type of chatbots, often provide readily-available information to help customers navigate the website. Companies with Fa-

cebook pages have also incorporated chatbots to assist customers with the information they need. Over a hundred thousand chatbots are activated in Facebook Messenger, and the number continues to multiply. Other tourism and hospitality companies have also ventured into more advanced versions of the chatbot like BB of KLM Royal Dutch Airlines, Hello Hipmunk, a virtual travel agent, HelloGbye travel assistant, and SAM. This AI-empowered travel bot can help flight booking and integrate all trips in one itinerary (Zlatanov et. Al, (2019). Modern versions of chatbots and digital kiosks are also developed to cater to tourists as most machines would have several language prompts for self-service applications. Languages included in the prompt are usually not spoken by the hotel staff. These machines also manage guests' preferences, issue key cards, and allow guests to pay their bills (Lukanova, et. Al 2019). This automated process alleviates the language barrier as guests almost need not speak with a hotel receptionist who probably speaks another language.

AI translation is likewise found to be in demand in the financial industry. Automated translations and assisting applications are two AI processes requiring translation. Like in tourism, chatbots are among the systems that are used together with instant messaging to assist customer concerns like service problems, fraud detection, and the like. Moritz, cited in Kunwar (Kunwar, 2019), has illustrated a model on the primary use cases of AI in financial technology, which includes a) accurate decision making, b) insurance management, c) fraud detection, d) predictive analytics, e) virtual financial assistant, and in all these, machine learning and automation are essential. Even developing countries like India conducted languages project to lower the language barriers that hampers financial services. The National Institute for Transforming India and Microsoft initiated the project of building NLP platforms for Indian languages, including the development of several applications in twenty-two (22) Indian languages. Moreover, financial services are said to be at the forefront of AI intelligence adoption, and among the systems that require the use of natural language processing is Amelia by IPsoft, which offers automated desk services; and the Credit Suisse, Narrative Science's Quill that assist by summarizing information by updates investment research using natural language generation (Apis Partners, 2019). A platform was innovated to make information understandable in multiple languages in an actual state. The Leverton, developed in Germany, is a data extraction application that automatically obtains information like rental leases, breaks options, and the like. The data obtained can be accessed and read in twenty (20) languages (Buchanan, 2019). Given the exponential nature of AI development, more languages can be added in the coming years.

In the healthcare industry, the need for language translation has shifted initially from having migrant patients to easing communication with patients known as healthcare tourists. Medical tourism is a relatively new opportunity for countries to generate economic revenue by opening their doors to cross-border patients. Traveling to another country to obtain elective surgery, dental treatment, reproductive treatment, organ transplant, medical checkups, and the like will require, apart from medical and technological skills, [18] language translation since target patients would come from the world over. In the recent report EIT Health, (EIT Health, 2020), they have cited Nelson on the advancements of NLP in healthcare, stating that algorithms have outperformed humans on General Language Understanding Evaluation—a test that measures language understanding, and that similar developments are underway in terms of reading, sound, and video comprehension. Moreover, part of the text innovations is a trained algorithm that shall include translation and the ability to answer with the possibility of having neural networks that can read scientific papers and yield summaries. For chronic care management, Sensely, an AI-generated virtual-assistant application, was developed to provide text-to-speech and speech-recognition technologies to guide patients through their daily-monitoring needs and provide assessment if one

needs to contact a physician. The potential of this system as far as multilingual service is concerned is that it can provide content in thirty-two (32) languages that cover fourteen (14) conditions and are increasingly becoming popular not only among health facilities but also with health insurance companies (EIT Health, 2020). AI is also used to develop conversation agents, which most adult patients find helpful. They would rather speak to a virtual coach or interact with a virtual nurse to monitor their health or diagnose their symptoms while at home (Matheny, 2019). Similarly, with other industries that continue to develop NLP in AI applications, it can be expected to add more languages in their subsequent pursuit, giving relatively more minor room for skilled translators in the workplace.

The academic industry has likewise been infiltrated by AI translation. While the AI chatbots can be used in the promotional aspect, AI technologies, as it turns out, can also be used to assist potential students from the early stages of inquiry and application up to their placement in the world of work. This can put forward works for natural language processing given the influx of international students that could boost the internationalization efforts in education. Computer-assisted translation tools have become a prime development in the translation industry. The range of automation systems that include translation memories, terminology extraction, and recognition tools, alignment, localization tools, spell checkers, grammar checkers, auto-suggest dictionaries, termbases, and many others has been found useful to many translators and learners. Although they do not automatically do the translation, they have been widely utilized in conducting verification of terminology consistency, source and target text alignment, reuse of previously translated documents, grammar and spell checking, pre-translation activities, terminology management, proper document formatting, document production, and post-editing. These tools have undergone significant development over the years. As for its use in teaching, these tools aid in teaching day-to-day situations for activities that may require translation like presentations, role-playing, collaborative activities, and even case studies. This means that computer-aided translation tools can help learners acquire technological and information mining skills and translation service competence (Ivanova, O. (2016). Moreover, AI purveyors have expanded their venture not only in assisting in the actual learning process but also at the onset of student application and even in evaluating occupation prospects. Stewart, Khar, and Khare (Khare, K., Stewart, B., & Khare, A., 2018) have proposed the AI system for SEPT or Student Experience Practitioner Transitions model by Morgan (cited in the same work), which can help assist students based on Morgan's framework. Morgans model covers the following stages: a) First Contact and Admission, b) Pre-arrival, c) Arrival and Orientation, d) Induction to study, e) Reorientation and induction, and f) Outduction. Under the first phase, First Contact and Admission, the student would input information about their study credentials and qualifications into a system that will provide a list of programs where student-applicants may qualify. The second and third phases of the SEPT can be covered once the student has selected a program. The system presents information on scholarships, volunteer activities, program information, reminders for first-year students, and even general school information—campus tours, library services, and other programs. The system's assistance can cover stages "d" and "e" in helping students keep track of the course requirements, deadlines, term schedules, and the like using the coherent presentation of options that can help students make decisions. For the last stage, the outduction, the system will once again help students decide if they would continue studying or venture to an advanced or even another degree. Since students would likely want to work after school, the system can provide career tools to help students get on track towards their job (Khare et. al, 2018). The proposed AI system offers potential in terms of helping students manage their study priorities and options if ever this will be developed. Other AI

systems developed to assist students are AI Tutors and AI programs that give students and lecturers constructive feedback. AI tutors may not be fully capable of teaching students the way human tutors do, but these could assist writing, basic math, and other subjects, while AI systems programmed to monitor students' development also function to notify instructors about it (Fahimirad, M., & Kotamjari, S. S., 2018). This could benefit schools with a large student population as they can assist teachers in managing and tracking student performance and provide a timely report. Delving further on the use of AI translation inside the classroom, several studies have been conducted to identify the efficacy of using machine translations for cross-cultural communication activity, which further impresses the need to converge at this time. Certain studies have attempted to use AI translation as part of activities where students communicate with students from another country. Shadiev and Huang (Shadiev, R., & Huang, Y.-M., (2016), have sought to determine the effectiveness of speech-to-text and computer-aided translation in a cross-cultural communication activity between Taiwanese students who speak Chinese and students from Uzbekistan who speak Russian. The study involved ten (10) students from the said countries guided by two (2) Chinese native speakers and Russian native speakers and experienced cross-cultural learning online. Aside from facilitating communication, the teacher's task is to check the systems being used for any clarification. Results revealed that participants had given a high rating in terms of usefulness in cross-cultural learning, citing that the systems have supported their exchanges and made them acquainted with their fellow student-participant in terms of interests, hobbies, food, and even differences in differences culture. Another study using a speech-enabled language translation system to facilitate understanding involved twenty-one (21) university students from thirteen (13) countries who voluntarily subjected themselves. Cross-cultural activities include self-introduction, introducing local tradition, experiencing foreign tradition, and sharing experiences. Obtained results have shown that participants have found the facilitation of AI translators to be adequate in terms of cross-cultural understanding. The facilitation has also enhanced the participant's inter-cultural sensitivity as the activities have been rated significantly higher with the participants. As to speech-enabled language translation (SELT) evaluation, it was found that the texts drawn from the system have been meaningful and useful to the participants (Shadiev, et. Al, (2018). Studies on the use of AI translation in the second language (L2) practice have shown that translation helps develop comprehension, vocabulary, composition writing, and speaking and that it promotes receptive and productive skills that make them aware of their learning strategies (Calis, E., & Dikilitas, K. (2012). Computer translation technology also has a positive role in aiding the learner, and the teacher since knowing to apply the technology is pertinent to the learner's translation competence. That translation teaching should activate learners' interest, and computers and the internet can help boost students' interest in learning (Bohatyrets, V., 2015). These results only prove that AI translation is indispensable even in the academe, just as in any industry. Having intelligent computer systems assist students in and out of the classroom can greatly help them function independently if not require minimal guidance. Furthermore, with the development of AI systems being in an aggressive phase, just as with other industries, significant language features, and multilingual capacity innovations can be expected to happen in AI translation in education.

***Responding to Perceived Challenges***

The rapid development in AI-translation, particularly in language processing and understanding, may appear to be a threat to the field of translation studies. There are various reasons that translation will always find its place in the ever-growing field of language studies. The responses to the challenges posed by the prevalence of artificial intelligence are drawn from what House (House, J. (2016) cites as the importance of translation studies: *translation is a part of*

*applied linguistics; translation is an essential part of today's revolution in communication as a cross-linguistic and cross-cultural communication, and translation is a cognitive process.* In addition, translation studies also have their share of trends and potentials.

The translation is a subdiscipline of applied linguistics. Being under this interdisciplinary field opens opportunities for language studies to thrive. Translation experts can continue to explore endless possibilities on the relationship, issues, and trends involving translation studies and other subdisciplines of applied linguistics like psychology, sociology, ethnography, anthropology, educational research, communication, and media studies, among others, and the same time, explore various themes (i.e., stylistics, discourse analysis, language planning, language policy) aside from literacy translation (House, J. (2016). As having the opportunity to look into these other subdisciplines and themes is wide enough, routes to exploring them across cultures will also guarantee that translation studies will have their firm place. One style of translation that will remain relevant is the thick translation proposed by Appiah (cited in Chen, 2018) as an essential method of defining methodological foundations for cross-cultural transactions. This style enriches the cultural and linguistic context of the work through annotations and accompanying glosses to locate the information in the text, highlighting the interpretative nature of both cultural anthropology and translation. To date, no AI system is capable of mimicking such style. A study shows that students taking a course on the translation of text recognize the role of the linguistic theory and its professional fields in the translation process and that those taking translation and interpreting courses perceive that the two linguistic-based courses are beneficial. They also found applied linguistics and helpful translation for their courses (Erton, I., & Tanbi, Y. , 2016). To firmly stress being under a broad discipline, translation studies practitioners must reflect on and adhere to theoretical and methodological concepts that articulate social responsibilities and ethics under this subfield. It is said that translation studies approaches that are aware of social responsibility enable to do beyond what motivates translators and interpreters to work based on what is good for society or oneself. This gives people an understanding of translation as a practice and allows practitioners to reflect on the ethical implications of translation studies' influences on scientific and technical development, cultural production, and social and political order (Drugan, J., & Tipton, R., 2017). Levinas (cited in House, 2018) requires elevated consciousness on the part of translation experts in terms of subjectivity and ethical responsibility and reflection on the ethical relationship between author, text, and translator. This provides researchers with direction should they intend to explore translation and ponder their intention for translating.

As mentioned earlier, one of the exciting facets of being in an era marked by convergence is that communication is quickly evolving and is more inclusive in terms of culture and nationalities, and at the same time, it implicates its quality as a linguistic process. The demand for translation and localization industries is ever-present. In media, when one translates news into another language and presents it to the people, it determines their opinions, behavior, and even politics (Sharma, S. K., 2015). Looking into the purpose of translation automatically ties it to communication as translation is intended to make the translated text intelligible for people who do not understand the original language from which the text is written. More than knowing foreign language and grammar, intercultural communication is among the fields translators must familiarize themselves to produce credible versions of the translated text. Since translators commonly work on various forms of written work—technical documents, legal documents, medical reports, film scripts, and the like—knowing the form and style of each type of writing is paramount as they are communicating the form and style in the target language (Koksal, O., & Yuruk, N., 2017). In some cases, translation is

found to be essential in improving government communication. Government stakeholders from a country with more than one official language agree to the importance of translation in linguistics and communication because translation requires cultural interaction, communication, and cooperation. Moreover, the translation process that undergoes several stages is found to be more reliable, and publishing translated documents facilitates communication. Stakeholders also impressed the importance of communicating with them during the translation process as they have regarded citizen consultation, public awareness, and public relations to be very important (Tuyisabe, C., 2018). In online social media (OSM), cultural communication influences may be attributed to AI translation given the less formal and concise nature of exchanges (like in micro-blogging site Twitter), but certain OSMs like Linked-in can promote professional translation as it promotes professional networks for those looking to expand business or professional linkages. An OSM-savvy translator for the said platform is, therefore, one that is not only adept in using virtual platforms but also one that is aware of linguistic and cultural nuances and can provide effective translation solutions for the target language (Dejardins, R. , 2017). The process of communication is also underpinned by the Reception Theory of communication which holds that translated materials have a way of continuing communication with the audience through interpretation of meaning based on the reader's cultural background and life experiences (Ma, 2018). This further strengthens the relevance of translation studies in drawing communication inputs from readers from across cultures. Since people, despite coming from a similar place, have varying cultural influences and are likely to react differently to a translated text. Therefore, translation studies, in a way, are instrumental to conveying one culture to another each time translated information gets circulated.

The quality of translation studies being cognitive process puts it ahead of the AI translation. Artificial intelligence is designed to imitate human behavior, but translation studies are borne from a (cognitive) process that causes humans to behave. This assumption is among the emerging trends in translation studies and is associated with linguistics, psychology, cognitive science, neuroscience, reading and writing research, and language technology. The concept primarily focuses on the translator's thoughts concerning their task. According to Ma (Lopez, 2018), the cognitive process of translation has led to the development of machine translation since computer translation is designed to follow patterns of human language in translation, although with limitations, of course. The translation is borne out of the meaning formed in the long-term interaction between language and experience, and translation is said to be a process of recreating what was understood, giving symbols to the author's subjective and objective world. This, however, is limited to the translator's understanding as there was no access to the author's world (or thoughts), and it is not precisely accurate to obtain that objective world. It is, therefore, the task of the translator's intelligence to distinguish and analyze it. Having the capacity to interact with the text being translated and form meaning is not yet fully complied by an automated translation which is why translation as a mental simulation is still fundamentally embodied to the way humans interact with the world, as can be observed with the impact of translation to the practitioner and audience (Borodotsky, L., 2019). Compared to AI translation, where inputs on NLP have to be programmed, monitored, and updated, the natural capacity of a translator is embedded in what is called a "languaged" brain that uses linguistic resources in processing incoming information from across the senses. To understand the human brain, one must understand the contributions of language, which is present when one starts to think and is part of the developmental force at the onset of learning and experience (Munday, 2016). Whatever advances AI translation will make will have to be based on what was discovered in terms of brain function and human behavior.

The current and recurring trends in translation studies center on the cultural angles and ideologies that influence translation. First is viewing translation as a form of rewriting. According to Lefevere (cited in Meidasari, n.d.) , rewriting is at work in translation and other allied fields like criticism and editing, and it focuses on the examination of established factors that systematically govern reception, acceptance or rejection of literary text, and of other issues like power, ideologies, institution, and manipulation which could be ideologically or petrologically motivated. An example of this is Edward Fitzgerald's translation of Omar Khayyam's Rubaiyat, which he successfully made to conform to the West's literary convention. Another trend focuses on the gender angle of translation, which can also be linked to culture. The "transdisciplinary" between gender studies and translation studies is one of the recurring trends in translation studies today. The two are structurally similar as they both have universal and international aspects imbued with constant local systems and applications where the struggle over meaning the capacity to identify meaning (Ma, 2018). Mundy has also cited Simon, who approaches translation from a feminist angle, as she elaborates on the language of sexism in translation studies, including the images of dominance, fidelity, and betrayal. Another facet relevant to this is the issue of language and identity, which incorporates linguistic methods in analyzing literary works with the cultural angel, which also exposes the social-ideological context of the exchange (Von Flotow, 2016).

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**Conclusions**

The significant developments in AI translation have benefited various industries, and the promise of immediate and more advanced development in imitating human behavior and cognition is made to keep up with the development phase of this time. Therefore, it is acceptable to expect AI development to be aggressive, for it means technology and innovation s living up to the demands of the times. The pervasiveness of AI translation does not appear to have any threats to cross-cultural translation studies as the latter being a subfield of applied linguistics, has its own set of trends and potentials that translation practitioners can explore. Translation studies could even continue to provide patterns of development that AI translation could follow.

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