

ANALYZING DIGITAL PLATFORMS IN MACHINE TRANSLATION

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Annotation. This article examines the role of digital translation technologies in the accurate transfer of culturally specific meanings across linguistic and cultural contexts. Particular attention is paid to electronic dictionaries, machine translation (MT) systems, computer-assisted translation (CAT) tools, and digital translation platforms as resources supporting contemporary translation practice. The study examines the limitations of automated translation technologies in processing culture-bound concepts, idiomatic expressions, implicit meanings, pragmatic nuances, and specialized terminology. It emphasizes the importance of professional post-editing as a mechanism for identifying semantic inaccuracies, resolving cultural asymmetries, and ensuring functional and pragmatic equivalence between source and target texts.

Keywords: digital translation technologies, machine translation, computer-assisted translation, CAT tools, electronic dictionaries, cultural meanings, culture-specific concepts, intercultural mediation, translation strategies, translation equivalence, professional post-editing, translator competence.

Introduction. Electronic reference resources employed in professional translation practice vary considerably in terms of their typology, subject-domain coverage, functional diversity, and the reliability of the information they provide. From the perspective of the present research, which focuses on the accurate transfer of culturally embedded meanings, a significant methodological concern is the comparatively limited degree of data verification and quality control in electronic dictionaries, machine translation (MT) systems, and computer-assisted translation (CAT) tools. This limitation may negatively affect translation accuracy, particularly when the source text contains culture-specific concepts, implicit meanings, culturally conditioned associations, or linguistic units that lack direct equivalents in the target language.

Accordingly, the effective application of electronic dictionaries, machine translation technologies, and digital translation platforms to the transfer of cultural meanings from the source language into the target language, as well as in the reverse direction, constitutes a relevant area of translation research. In this context, the accuracy and adequacy of rendering culturally specific meanings within the conceptual framework of another culture can be substantially improved through professional post-editing. Human intervention at the post-editing stage enables the translator to identify semantic distortions, compensate for cultural asymmetries, select contextually appropriate equivalents, and ensure that the translated text adequately represents the cultural and pragmatic content of the original.

Experienced translation practitioners frequently emphasize the mediating function of the translator in intercultural communication, maintaining that translators perform an essential role in the contemporary world by facilitating interaction, mutual understanding, and cooperation among representatives of different linguistic and cultural communities [2, p. 12]. This perspective conceptualizes translation not merely as a process of interlingual substitution but as a complex form of intercultural mediation requiring linguistic, pragmatic, sociocultural, and subject-specific competence.

When professional translators are asked which types of texts present the greatest translation

difficulties, their responses generally identify several particularly challenging categories: texts containing highly specialized terminology associated with advanced technologies; legal and regulatory texts requiring a high degree of terminological and conceptual precision; authorial texts characterized by extensive idiomaticity and individual stylistic features; and culture-oriented texts in which the translator must reconstruct culture-specific meanings, connotations, pragmatic implications, and subtle linguistic nuances in the target language. The translation of such materials therefore requires not only advanced bilingual competence but also specialized knowledge, intercultural awareness, contextual interpretation, and the ability to apply appropriate translation strategies and procedures.

Addressing these translation challenges requires translators to employ a broad range of “linguistic resources” [2, p. 13], including specialized electronic dictionaries, terminology databases, parallel and comparable corpora, translation memories, machine translation systems, CAT tools, and other digital reference resources. Nevertheless, the effectiveness of these technologies depends substantially on the translator’s professional competence and critical evaluation of automatically generated solutions. Consequently, digital translation technologies should be regarded primarily as supportive instruments within the translation process, whereas the professional translator retains a central role in interpreting, adapting, verifying, and accurately transferring culturally conditioned meanings between the source and target linguistic-cultural systems.

Literature review. Zaitseva also examined the performance of the Yandex machine translation service; however, her study focused specifically on English-to-Russian translation [4]. To systematize the translation errors identified in the corpus, the researcher employed a classification framework comprising two principal categories: lexico-semantic errors and errors in the transfer of culture-specific references. Each category was subsequently divided into several subcategories. The lexico-semantic category encompassed errors involving the translation of individual lexical units and multiword expressions, while errors associated with slang and metaphorical expressions were treated as separate subgroups. The second category included inaccuracies in rendering historical, cultural, and geographical realia, as well as culturally conditioned errors resulting from insufficient contextual information. However, the study did not provide quantitative data concerning the frequency or distribution of the identified error types. The classification proposed earlier by D. M. Buzadzhi served as the methodological basis for Krasilnikova’s comparative investigation of Google and Yandex machine translation systems [2]; [5]. Her research examined the Russian translation of an English-language popular-science text dealing with medical subject matter. Owing to the genre-specific characteristics of the source material, the category relating to errors in conveying the author’s evaluative stance was excluded from the analytical framework. The study provides detailed quantitative evidence concerning translation errors. In both systems, the most frequent errors involved inadequate transfer of the denotative content of the source text, accounting for 46.7% of all errors produced by Google Translate and 42.8% of those generated by Yandex Translator. Within this category, inaccurate information transfer constituted the predominant subtype, representing 34.3% and 32.6% of all errors, respectively. By contrast, omissions, additions, and substitutions occurred comparatively infrequently. The next most prominent category consisted of stylistic errors, which accounted for 40.0% of Google Translate errors and 42.4% of Yandex Translator errors. Violations of target-language norms and conventional usage represented 13.3% and 14.8%, respectively. These findings demonstrate that the two machine translation systems exhibited broadly comparable patterns in the distribution of translation errors [1].

In another study, Sitdikova et al. [12] investigated the performance of Google Translate in

rendering English-language film subtitles into Russian. The researchers classified 53% of the detected errors as lexico-semantic errors. This category included the system's inability to select an appropriate context-dependent meaning of a lexical unit, incorrect translation of multiword expressions with non-literal meanings, and inaccuracies in rendering proper names. Morphological errors constituted the second category and accounted for 28% of the total, whereas syntactic and stylistic errors formed the third category, representing 19%. The authors further emphasized that lexico-semantic errors had the most substantial negative impact on the comprehensibility of the translated subtitles. Shusharina and Petrunina [17] conducted a comparative analysis of Google and PROMT by examining their performance in translating English texts representing different functional styles into Russian. A distinctive methodological feature of their research was the use of V.N.Komissarov's classification of translation transformations as the conceptual basis for categorizing errors. Accordingly, the identified phenomena were divided into lexical, grammatical, and lexico-grammatical categories. The researchers did not provide quantitative frequency distributions for the individual error categories, focusing instead on specific translation examples and their qualitative interpretation. Their analysis nevertheless led to the conclusion that the overall translation quality produced by the two systems was broadly comparable, although Google demonstrated a somewhat lower incidence of grammatical errors.

A noteworthy error typology was proposed by Pavlova and Ryabova [9], who investigated the English translations of Russian scientific and technical texts generated by Google Translate. The researchers operationally defined a translation error as any machine-generated translation segment that required subsequent modification by a professional translator. On this basis, they developed a three-part classification: Group A — meaning transfer, encompassing accuracy and completeness; Group B — content, including logical consistency and factual accuracy; and Group C — language and style, comprising fluency, adaptation, sublanguage conventions, idiomaticity, and technical errors.

The quantitative findings of Pavlova and Ryabova's study indicate that 88% of all identified errors belonged to the language and style category. No errors were detected in several subcategories, particularly completeness, understood in terms of information omission or addition, and factual accuracy. Technical errors associated with spelling and punctuation were likewise relatively uncommon, representing only 4% of the total error count. The authors identified several major factors contributing to reduced translation fluency: the use of framing sentence structures; excessive use of the preposition of when rendering complex multicomponent genitive constructions; verbosity; unnatural theme–rheme organization; excessive syntactic segmentation; and tautological repetition [22]. Similarly, Shevchuk [16], whose research also addressed translation into English, reported a high frequency of omitted or incorrectly used articles and identified substantial cross-linguistic interference, particularly at the syntactic level.

At the present stage of technological development, machine translation (MT) has become firmly established as an important component of the professional translator's toolkit. When combined with appropriate post-editing procedures, MT can facilitate a wide range of professional translation activities, including commercial translation, as demonstrated by surveys of professional translators and employees of translation companies [8]. Machine translation technologies have also acquired considerable relevance in foreign-language education and translator training.

The principal advantages commonly attributed to MT include its continuous technological development and progressive improvement in output quality, accessibility, ease of use, high processing speed, confidentiality, and interoperability with other software applications and digital resources. Modern MT systems can also be integrated into automated workflows to translate websites, audiovisual subtitles, and other forms of digital content [14]. Nevertheless,

the overwhelming majority of researchers emphasize that machine-generated output should be approached critically. Consequently, human post-editing remains necessary for identifying and correcting potential translation errors and ensuring that the target text satisfies the required standards of accuracy, adequacy, fluency, and linguistic acceptability.

Discussion. A substantial body of research has addressed the typology and classification of translation errors, including errors generated by machine translation systems [5]. Nevertheless, no universally accepted classification framework has yet been established. Several recurring methodological limitations can be identified across existing typologies. These include the difficulty of establishing a single and internally consistent classification criterion, the overlap between proposed error categories—which may prevent the unambiguous assignment of a particular error to a single class—and the inability of existing taxonomies to encompass the entire range of potential translation errors. These limitations reflect the inherent complexity and multidimensional nature of translation error analysis. Despite these methodological challenges, the available research permits several general conclusions.

First, the classification of translation errors is largely conditioned by the language pair, the direction of translation, the text type or genre, and the communicative purpose of the translation. It therefore appears methodologically appropriate to develop error taxonomies that are tailored to clearly specified translation parameters. Such classifications may also be designed to investigate particular linguistic phenomena, thereby functioning as targeted analytical frameworks rather than universal taxonomies [3].

Second, in the context of machine translation, the particular MT system or architecture under investigation may theoretically influence the structure and distribution of identified errors. Empirical findings, however, indicate that the error distributions observed in Google Translate, Yandex Translator, and PROMT—among the systems widely examined in Russian-language research—are generally similar [17]. This suggests that, despite system-specific differences in translation output, comparable categories of errors tend to recur across different MT platforms.

Third, classifications originally developed on the basis of human translation may provide a useful theoretical foundation for the analysis of machine-generated translations. Nevertheless, such frameworks cannot simply be transferred without modification. They require substantial adaptation in order to account for the technological, algorithmic, and linguistic characteristics specific to machine translation and for error patterns that emerge from automated text processing.

Fourth, the majority of existing translation-error classifications employ a two-level hierarchical structure. At the first level, researchers most frequently distinguish between lexical or lexico-semantic errors, grammatical errors, including morphological and/or syntactic deviations, and errors associated with violations of target-language norms, conventions, and usage. By contrast, classifications based on the causal origin of machine translation errors remain relatively uncommon. One example is P. N. Khromenkov's classification [11, pp. 67–76], which distinguishes between errors arising during automatic analysis and those occurring during automatic synthesis. Another relevant approach is presented by Al Sharou [19], who examines both translation errors themselves and characteristics of the source text that may trigger erroneous machine-generated output.

Fifth, the findings of the reviewed studies indicate that lexico-semantic errors constitute the most frequently occurring category of machine translation errors. In contrast, spelling and punctuation errors are relatively uncommon in contemporary MT systems. Errors involving the complete omission of individual lexical units or larger textual segments likewise appear with comparatively low frequency [20]; [21]. This pattern suggests that modern systems are generally effective at maintaining formal textual completeness and surface-level orthographic correctness,

while semantic selection and context-sensitive lexical interpretation remain more challenging.

Sixth, translation errors differ substantially in their communicative severity and therefore should not be treated as analytically equivalent. The significance of an error depends not only on its formal linguistic category but also on the extent to which it disrupts meaning transfer, target-text comprehensibility, and communicative effectiveness. From this perspective, lexico-semantic errors carry the greatest communicative weight, since inaccurate lexical selection or semantic interpretation may distort the intended meaning of the source text and consequently lead to a communicative breakdown.

Conclusion. Thus, analysis demonstrates that the effective translation of culturally specific and specialized texts requires an integrated approach combining digital translation technologies with professional human expertise. Although electronic dictionaries, machine translation systems, CAT tools, terminology databases, parallel corpora, and other digital resources can substantially improve translation efficiency, their output cannot be regarded as fully reliable without systematic evaluation and professional post-editing. This limitation is particularly evident in texts containing culture-specific meanings, specialized terminology, pragmatic implications, historical references, connotations, and context-dependent lexical units. The reviewed research on machine translation also reveals that translation errors can be systematically classified according to their linguistic and semantic characteristics. Lexico-semantic inaccuracies, including the incorrect rendering of individual lexical units, culture-specific references, and multiword expressions, constitute a significant category of machine translation errors. Such shortcomings demonstrate that even advanced neural translation systems may encounter difficulties when processing context-sensitive, culturally marked, or semantically complex language. Therefore, quantitative error analysis should be complemented by qualitative assessment in order to determine not only the frequency of translation errors but also their causes, communicative significance, and potential impact on the target text. Overall, digital translation technologies should be regarded primarily as supportive instruments within the professional translation process rather than as autonomous substitutes for human translators. Their effectiveness depends on the translator's ability to select appropriate digital resources, assess machine-generated output critically, and perform context-sensitive post-editing. The integration of artificial intelligence with professional translation competence thus provides the most effective framework for ensuring semantic accuracy, terminological consistency, pragmatic adequacy, and the appropriate transfer of cultural meanings between the source and target linguistic-cultural systems.

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