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THE INTEGRATION OF COMPUTER-ASSISTED TRANSLATION TOOLS INTO THE TRANSLATION PROCESS

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Abstract: This article explores how computer-assisted translation (CAT) tools have developed and changed the work of translators. It focuses on the role of translation memory, machine translation, and cloud-based platforms, from early translation technologies to modern tools such as SDL Trados, memoQ, and Memsource. It also examines the main features of CAT tools, including terminology management, segmentation, translation matching, quality assurance, and project management. Although these technologies help translators work more efficiently and maintain consistency, they also present challenges, such as loss of context, outdated translations, and errors in machine-generated suggestions. The article highlights the importance of human judgment in evaluating automated suggestions and ensuring translation quality.

Keywords: computer-assisted translation (CAT), machine translation (MT), translation memory (TM), terminology management system (TMS), cloud computing, quality assurance (QA), segmentation, post-editing.

1. Introduction

Technology has changed the way translators work. Today, many translators use computer-assisted translation (CAT) tools to reuse previous translations, manage terminology, maintain consistency, and complete projects more efficiently. These tools have become an important part of professional translation. The development of CAT tools is closely linked to early research into machine translation. Although researchers initially aimed to automate translation, the limitations of fully automated systems highlighted the need for human involvement. As a result, greater attention was given to technologies that assist translators in their work. One major development was translation memory, which stores previously translated text segments and suggests them when similar content appears in new projects. Over time, CAT tools began to combine translation memory with terminology databases, quality assurance features, and machine translation. The arrival of cloud-based platforms made these tools more accessible, allowing translators to work online and collaborate from different locations.

2. Literature Review

Research on computer-assisted translation (CAT) draws on computational linguistics, translation studies, and information technology. Previous studies have examined the development of translation technology, the role of translation memory, and the challenges of using automated tools. The 1966 ALPAC report questioned the effectiveness and economic value of early machine translation systems. It encouraged a more practical approach to translation technology, with greater attention to specific linguistic problems and tools that support human translators. Advances in digital text storage and retrieval later helped create the conditions for translation memory systems.[1] Bogucki (2009) discusses translation memory as a database that stores source-language segments alongside their translations.[2] These databases allow translators to reuse previous work, especially in technical, legal, and other texts containing repeated content. CAT tools expanded this

[1] ALPAC. (1966). *Language and Machines: Computers in Translation and Linguistics*. National Academy of Sciences, National Research Council.
[2] Bogucki, Ł. (2009). *Tłumaczenie wspomagane komputerowo*. Warsaw: Wydawnictwo Naukowe PWN.

approach by combining translation memory with terminology databases, text editors, quality assurance, and project management features. Vinay and Darbelnet (1958/2000) discuss translation units in relation to translation procedures, while Newmark (1988) highlights the importance of sentences in preserving meaning and style.[3] In CAT tools, texts are divided into smaller segments that can be stored and reused. Although segmentation improves consistency and efficiency, Declercq (2015) notes that it may also reduce attention to context and encourage overly literal translation.[4] Costa-Jussà (2015) examines hybrid approaches to machine translation, which combine different computational methods.[5] Integrated into CAT tools, machine translation provides suggestions that translators can accept, revise, or reject. Cloud computing has also expanded access to translation technology. Mell and Grance (2011) describe it as providing on-demand access to shared computing resources. In translation, cloud-based platforms allow users to access tools online and collaborate from different locations.[6] These technologies support translation work, but human judgment remains essential for ensuring accuracy and contextual appropriateness.

3. Methodology

This study examines the development of computer-assisted translation tools through a review and comparison of existing literature. It focuses on the historical development of CAT tools, their main functions, and their integration with machine translation and cloud-based platforms. Their advantages and limitations are analyzed with particular attention to translation quality, consistency, and productivity.

4. Discussion and Results

Computer-assisted translation developed from early attempts to automate translation into technology designed to support human translators. CAT tools combine several resources within a single translation environment. Their main functions contribute to consistency, efficiency, and the systematic management of translation projects.

- Translation memory management. Translation memory stores previously translated segments and suggests corresponding translations when similar content appears in a new project. It is particularly useful for texts with repeated sentences or standardized terminology. As the database grows, the possibility of reusing previous translations increases.
- Terminology management. A termbase stores specialized terms and their equivalents in multiple languages. Unlike a translation memory, which generally stores paired segments in a fixed source-target direction, a termbase can contain terminology in several languages and support searches in different directions. It helps translators maintain consistent terminology throughout a project.
- Quality assurance. Many CAT tools include automated checks for inconsistent terminology, missing translations, incorrect numbers, punctuation problems, and missing formatting tags. These functions help translators identify potential errors before delivering a project. However, automated checks cannot replace comprehensive human proofreading.

[3] Vinay, J.-P., & Darbelnet, J. (2000). *A Methodology for Translation*. In L. Venuti (Ed.), *The Translation Studies Reader* (pp. 84–93). Routledge. (Original work published in 1958.)
[4] Declercq, C. (2015). *Study on segmentation in computer-assisted translation.*
[5] Costa-Jussà, M. R. (2015). *Work on hybrid machine translation systems*.
[6] Mell, P., & Grance, T. (2011). *The NIST Definition of Cloud Computing*. NIST Special Publication 800-145. National Institute of Standards and Technology.

- Translation matching. CAT tools compare new segments with existing translation memory entries and classify the results according to their degree of similarity. This function helps translators identify previously translated material and determine how much revision a suggested translation requires.
- Project management and collaboration. CAT tools allow translators to organize documents, manage translation resources, prepare project packages, and distribute work among multiple translators. These functions are particularly useful for agencies handling large projects with strict deadlines.
- Support for multiple file formats. Many CAT tools process documents in formats such as DOCX, XLSX, PPTX, HTML, XML, XLIFF, and subtitle files. File filters help extract translatable content while preserving relevant formatting and technical structures.

The analysis indicates that these functions work together rather than independently. Translation memory improves reuse, terminology management supports lexical consistency, and quality assurance helps identify technical and linguistic problems. Their combined use can improve productivity without removing the need for human decision-making.

Translation memory matching is one of the central mechanisms of CAT tools. When a translator opens a segment, the software searches its database for similar source-language content. Common match categories include:

Repetition**:** A segment that has already been translated within the current project appears again.

Context match: The segment matches a translation memory entry and the surrounding context also meets the system's matching requirements.

Exact match: The source segment is identical to an existing translation memory entry, generally represented as a 100% match.

Fuzzy match: The source segment is similar, but not identical, to a stored segment. The translator must examine the differences and revise the suggestion where necessary.

No match: The system cannot find a sufficiently suitable translation memory entry.

These categories help translators estimate how much work a segment may require. However, a high matching percentage does not automatically guarantee a correct translation. A previously translated segment may be grammatically incorrect, outdated, or inappropriate for the current context.

Advantages and limitations of CAT Tools

CAT tools improve productivity, terminology consistency, translation reuse, and project coordination. They are especially useful for technical documents and projects containing repeated content. However, their effectiveness can be limited by context loss, outdated translation memories, compatibility issues, and the cost of software or training. Repeated or fuzzy matches may also affect how clients calculate translation fees. These limitations highlight the importance of choosing suitable tools and evaluating their suggestions rather than relying on automation alone. A typical CAT-based project involves several stages:

1. Reviewing the source files and client requirements.
2. Selecting or creating a translation memory and terminology database.
3. Importing the files and checking segmentation.

4. Translating the text using available matches and machine translation suggestions.
5. Reviewing the translation and correcting errors.
6. Running quality assurance checks and proofreading the complete text.
7. Exporting and delivering the final document.

This workflow combines automated support with human decision-making. CAT tools organize resources and suggest translations, but the translator remains responsible for accuracy, consistency, and overall quality.

5. Conclusion

Computer-assisted translation tools have made translation work more efficient by combining translation memory, terminology management, quality assurance, and machine translation. Cloud-based platforms have also improved accessibility and collaboration. However, challenges such as context loss, inaccurate suggestions, outdated databases, and data security remain. Ultimately, CAT tools can improve productivity and consistency, but high-quality translation still depends on the translator's linguistic knowledge, contextual understanding, and careful review.

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