Advances in Computer, Signals and Systems (2024)
Clausius Scientific Press, Canada

DOI: 10.23977/acss.2024.080605
ISSN 2371-8838 Vol. 8 Num. 6

Optimizing Multilingual Communication with Computer-Assisted Translation Tools

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Keywords: Computer-Assisted Translation, Translation Memory, Terminology Management, Multilingual Communication, Global Enterprises

Abstract: In today's globalized economy, enterprises conducting business across diverse markets demand precise multilingual communication. Computer-assisted translation (CAT) tools, including Translation Memory (TM) and Terminology Management Systems (TMS), enable consistent, error-free, and high-quality multilingual communication by leveraging advanced computational techniques. This paper explores how TM and TMS help ensure consistent terminology and quality translations. It discusses how TM and TMS assist translators by providing a reliable source of references, reducing rework, and how they facilitate greater consistency of translations across global business sectors. Moreover, it examines how businesses use TM and TMS to streamline workflows, reduce repetitive tasks, and optimize resource utilization, thereby improving speed and reducing costs. In conclusion, this paper outlines how TM and TMS are essential for maintaining consistency in brand messaging and adhering to industry regulations. It draws on industry examples from technology and healthcare fields to demonstrate how the adoption of TM and TMS has assisted enterprises in delivering effective multilingual communication.

1. Introduction

Consistent, error-free and effective communication is key to the success of an expanding global enterprise. As businesses invest more into international markets, desired results can only be achieved if the multilingual communication produced is error-free, relevant to a culturally diverse audience, and consistent across different languages to maintain a company's reputation, respect the laws of different regions, and approach other cultural groups. To achieve such a high standard in communication in the world, companies use high-tech translation tools and dialect technology. Two of the most important tools for a high-quality translation are translation memory (TM) and terminology management system (TMS). TM is a memory that keeps a database of previously translated content. When working on the same client's content again and it requires translation, translators have access to their TM if the company or client makes TM accessible to translators. Therefore, TM enables translators to re-use a previous translation of the same sentence or passage again and again. If a company has accumulated a vast amount of TM, a translator will be able to access relevant information in their TM when working on the same client or content again [1]. On

the other hand, TMS is a database that helps translators manage the terminologies in a document or a certain project, by analysing the terminologies that are used in a document or project. The use of TMS in a company or client in the translation process will be highly beneficial in ensuring that the same terms are used in the different languages. TM and TMS make a strong base for CAT - computer-assisted translation. This type of translation allows translators to work in an efficient way, help them check on quality assurance and consistency, and finish their translations more quickly. This paper aims to explore how TM and TMS can help make communications more consistent and high quality, and it also explores the real-world competitive cases from technology and healthcare sectors to illustrate the usefulness of TM and TMS and how TM and TMS systems can be applied to global enterprises.

2. Enhanced Consistency across Translations

In addition to ensuring consistency between files, TM and TMS systems additionally support consistency between translators by making approved translations and terminology accessible to translators and ensuring consistent use of terms and phrases throughout files and across languages. In a branding context, this is crucially important for maintaining a consistent and upholdable brand voice and message in various global markets. To the extent that TM and TMS systems are integrated into a workflow, every translator can avoid the pitfall of inconsistency and maintain consistent documents in multiple languages. In some areas (such as legal, medical and technical translation), terminology is essential and inconsistency in terms and phrases can be very problematic. For instance, consistency in legal term translation across multiple languages ensures that there are no confusions in cases of international clients, while ensuring consistency in medical term translation and term usage reduces the risks associated with gaps in communication between doctors and patients, and ultimately enhances patient safety. Generally, consistency achieved by the adoption of TM and TMS paves the way for quality translation, customer trust and a robust brand reputation across borders in cultural and linguistic contexts. [2] To determine, in quantitative terms, if TM and TMS really can improve consistency of translated content, let's define a consistency score CCC, due to a combination of TM and TMS contributions and industry factors:

$$CCC = TM_c \times TMS_c \times I_w \quad (1)$$

c: Overall consistency score across all translations. TMc: Contribution of Translation Memory to consistency, measured by the percentage of reused translations that align with previously approved translations. TMSc: Contribution of Terminology Management Systems to consistency, measured by the percentage of terms consistently used across documents. Iw: Industry-specific weighting factor reflecting how crucial consistency is in that field. For example, the legal industry might have a higher weight compared to a less regulated industry.

2.1. Increased Translation Efficiency

TM improves translation efficiency as the system caches content that has already been translated, which means that when the translator goes back to edit, the existing translation is already on the screen, so the focus can be on the new content, and if necessary, on the reuse of previously translated phrases. Similarly, TMS allows the translator to quickly and easily find previously approved terminology. Whereas a translator tackling a large-scale project might have spent a lot of time searching for the correct translation of a compound or technical term, TMS allows the translator to access sets of pre-approved terminology. Such efficiencies ultimately lead to faster turnarounds and lower costs, particularly for large translation projects or updates to multilingual content on existing websites. The scalability of translation operations for enterprises in the global

marketplace is greatly enhanced by the decreasing amount of repetitive work and optimal application of resources in the translation processes through TM and TMS. Product manuals and instructions across a vast spectrum of technologies replete with repetitive content are a common translation scenario [3]. For instance, a series of similar questions such as 'Do you have a chronic cough?' and 'Do you have a sore throat?' are highly repetitive, but consistency in the terminology is still important. TM can facilitate the correction of previous translations and enhance the consistency of the content in a quick manner. TMS is also used to make it easy for translators to access standard language resources.

2.2. Improved Translation Quality

TM grants transparency and examples to use as reference and help translators while they work, and to also provide necessary input for the next step: quality check which will, in turn, help them produce higher quality translations. TMS helps with terminology consistency, whether it's industry-specific or related to a particular client. It will also vastly reduce the chance of errors being taken by the text and any further consequences these errors may bring. Moreover, introducing TM/TMS allows translators and reviewers to work efficiently. It leaves space for feedback and continuous improvement [4]. Figure 1 below illustrates how the use of TM/TMS may affect various areas responsible for improving translation quality. Translation Memory (TM) and Terminology Management Systems (TMS) have a significant role in improving different aspects of translation quality, such as quality assurance, consistency, and continuous improvement.

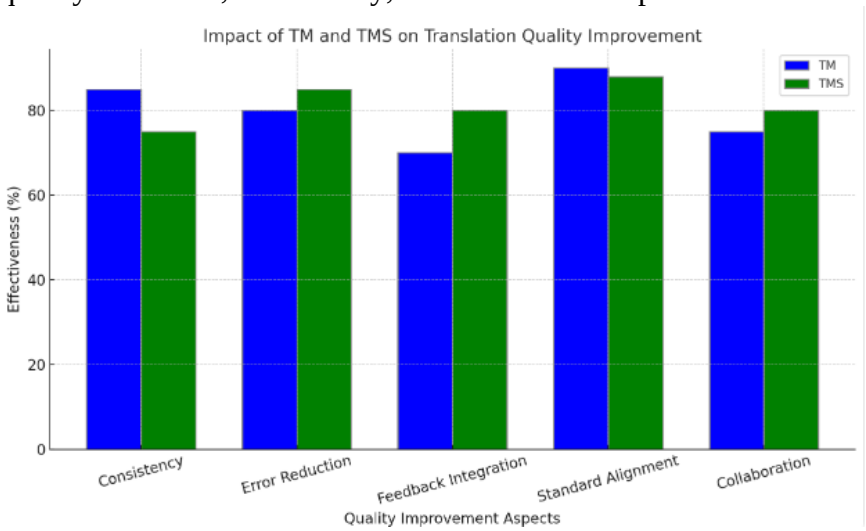

Figure 1: Impact of TM and TMS on Translation Quality Improvement

3. Implementation Strategies for TM and TMS in Global Enterprises

3.1. Selecting The Right Tools

It is essential for global enterprises to choose carefully the right CAT tools to integrate TM and TMS, as translation needs, project scales and working languages differ between different types of corporations. When selecting the CAT tools to apply TM and TMS, enterprise leaders should consider whether the software is compatible with the existing enterprise systems, how user-friendly the user interface is, how scalable and customisable the software is, and whether the software can support the translation of multiple languages and formats of different files. The optimised combination of the CAT tools can assist global enterprises to integrate TM and TMS more

efficiently, and ensures that other translation aids can work effectively together, so that the translation resource can be optimised and every translating project can be finished within a reasonable time frame. Additionally, multiple translators can work on one document, which ensures high-quality translation. In general, through the application of TM and TMS, the translation cost of global enterprises can be decreased, and translation resources can be used more efficiently [5].

3.2. Integrating TM and TMS with Existing Workflows

Ultimately, enterprises who need to use TM or TMS need to embed them in existing systems and workflows - as per project requirements. Depending upon the enterprise's situation, some of the existing workflows may need to be tweaked a little and TM or TMS tools may need to be customised to suit company requirements and translation software and platforms. The enterprise may need to do some training for translators and project managers alike to ensure that they can leverage these systems to create good quality multilingual content. The rationale behind mapping TM and TMS into existing systems and workflows is to expedite enterprise translation operations and ensure a production cycle that outputs consistent, high-quality multilingual content [6]. An enterprise may need to rebuild its workflow to enable an automated quality check and a final terminology update before the translation is even completed. In essence, the translators, project managers and the IT team need to work together to meet this requirement. Table 1 provides an example of how an enterprise might integrate Translation Memory (TM) and Translation Management Systems (TMS) into existing workflows, highlighting the changes at each step and the expected outcomes.

Table 1: TM and TMS Integration Example Workflow

Workflow Step	Current Process	Proposed TM/TMS Integration	Outcome
Document Preparation	Manual document preparation by content creators.	Automated document preparation with content management system.	Faster preparation, less manual work.
Translation Memory Integration	No TM integration, translations are done from scratch.	TM integration to reuse previous translations, reducing effort.	Increased consistency, reduced translation time.
TMS Customization	No TMS, translations managed manually.	Customization of TMS to match company-specific workflows.	Improved workflow efficiency, better project tracking.
Translator Training	Translators use personal tools, no standard training.	Standardized training on TM tools to ensure consistency.	Consistent translation quality across all projects.
Project Manager Training	Project managers use email and spreadsheets.	Project managers trained on TMS for seamless project tracking.	Streamlined project management, fewer errors.
Automated Quality Check	Manual quality check by senior translators.	Automated quality check integrated into TMS.	Higher quality content with fewer revisions.
Final Terminology Update	Terminology update done after translation.	Terminology update automated before translation completion.	Terminology consistency across all documents.
Content Delivery	Content is delivered via email.	Content delivered via TMS with automated notifications.	Faster delivery, better client satisfaction.

3.3. Training and Support for Translators

Training and supporting translators well is also key to good use. Enterprises should provide ongoing support for their translation teams via user manuals that explain how to use the translation

tool in detail (step-by-step), a help desk for technical support, and so on. Trained translators can achieve the aforementioned benefits of TM and TMS. Training should cover tool features and functionalities to help make the translation process more efficient, and best translation practices to ensure consistency and quality [7]. Training sessions could include how to set the TM to search for 80-90 per cent text similarity, how to manage a TB, and how to use the feedback from a transor TB reviewer for consistency. A resource centre or a community of practice, for example, can serve as a way or place for enterprises, like Language Champions, to offer their translation team support, keep them informed and updated, and continue their work.

4. Challenges and Solutions in Implementing TM and TMS

4.1. Managing Large Volumes of Data

Based on this example, the TM or TMS data created from translation projects and translated content in multiple languages can be overwhelming for global enterprises. Here, once enterprises go global, tremendous content needs translation and management. When the volume of data surpasses a certain point, it becomes quite challenging to organise or maintain the TM or TMS databases or store accurate data. How can we address these challenges? First, global enterprises can implement advanced practices in data management. For instance, they can regularly maintain the TM or TMS database and establish a clear governance on data entry and validation [8]. Then, enterprises can relieve the burden of data management by leveraging the cloud and artificial intelligence. For example, with an automated tool, when the data in TM is entered, the tool can access the same data set and remove duplicate data from the TM database to avoid cluttering the database with data sets of the same content in different terminologies. In addition, the cloud platform can support a real-time collaboration and update of the TM or TMS data. This allows translators and project officers to access the latest data anywhere the internet is available.

4.2. Ensuring Terminology Consistency

Table 2: Terminology Consistency across Languages

Language/Region	Terminology Consistency Score	Standardized Terms Used	Potential Inconsistencies Flagged	Automated Suggestions Provided
English (US)	92	1500	5	20
English (UK)	89	1450	8	25
French (FR)	85	1400	10	30
Spanish (ES)	88	1420	7	22
German (DE)	90	1480	6	18

Terminology Management Systems can support an enterprise's globalization trend. However, they also have challenges in guaranteeing terminology consistency across different languages and regions due to cultural differences, regional requirements and industry specifications. In order to be consistent with terminology, an enterprise should make a comprehensive list of terminology guidelines and glossaries. Those related terms need to be reviewed periodically to be kept up to date. In the long term, with subject matter experts and linguists' helps, the terminology can be identified and standardized across languages and regions [9]. As for the challenge of terminology consistency from the perspective of translation technology, a cloud-based platform will be able to help translators to address this issue.

Firstly, TMS can achieve automated terminology checks to prevent translators from using wrong terms. Secondly, in real time, TMS can also offer corresponding terminology suggestions. Moreover, a TMS can store all the related terminology data in a TM database and make this data avaiable to all the relevant stakeholders of an enterprise. This helps to make sure that users can access the correct data anytime. All in all, these standardized terms and tools for TM consistency can be contributivie to the process of globalization. It is indicated by Table 2.

5. Case Studies of TM and TMS in Action

5.1. Technology Sector

Leading technology companies often face challenges in translating technical documents and user interface into multiple languages. To improve translation speed and consistency for localisation of all deliverables in any release globally, a tier-one software company used TM and TM system to create a faster and more consistent localisation process in all the translated deliverables for global product release. They used TM to save and reuse previously translated strings of software and users' manual. TM reduced translation cost and improved the time to market for a new release. TMS standardised technical terminology across all the translated content to follow the industry standard and company's internal glossary. In this case study, TM and TMS help the global publications of high-end technology translation for technology companies, who release new software/hardware product to the world every year. The company built a centralised terms database for all the partners and teams to use all the standard terms in the database when they created technical translations. This helps all the teams to use and connect all the apps worldwide. The translation cost was reduced, the quality of the translation was improved, and all the teams could use the most updated and the most correct standard term, it provides consistency for all apps in the company [10].

5.2. Healthcare Industry

Another life-or-death use of TM and TMS in healthcare can be found in the same multinational pharmaceutical company. Initially, they used TM and TMS to manage documentation for various clinical trials (including a new class of alerting and memory-enhancement drugs with a much faster onset than previous stimulants for Alzheimer's disease patients), along with patient information leaflets, regulatory submissions and documents for multiple languages. This helped the company maintain the highest degree of precision and consistency of any language-based documentation used in the trials. TM also allowed translators, subject-matter experts and regulatory personnel to share data and work more efficiently with each other on the quality of their translations. The case study that emerged from this work is an excellent example of how TM and TMS can impact translation quality in healthcare by ensuring compliance. At the same time, the company created a strict quality assurance system: periodic, systematic and thorough reviews and updates of the TM and TMS databases to ensure that the quality of all translations is the highest attainable.

5.3. Financial Services

Accurate and consistent translation of financial terminology is fundamental to the activities of this company and other firms in the financial services industry. An international TM and TMS solution was provided to a well-known global investment bank to speed up and standardise the translation of vast amounts of documentation, including annual reports, regulatory filings and other client communications in more than 20 languages. Close collaboration between the in-house legal team, external translators and local compliance officers was facilitated by the TMS, ensuring that

every translated document followed both the international standards of financial terminology and the company's internal language style guide. This level of collaboration, coordination and simultaneous review helped to reduce expenditure and speed up processes, generating long term efficiency savings for the project. The TMS also automated a great deal of the workflow, from the initial submission of a document for translation to the ultimate approval process. Any updates, corrections or revisions could be incorporated without human intervention.

6. Conclusions

Enterprises require higher quality, more consistent and quicker multilingual communication in an increasingly interconnected world. Computer-assisted translation (CAT) tools, such as TM and TMS, are crucial in contributing to this goal. They help enterprises manage constant linguistic challenges, such as brand messaging and industry compliance standards, across a variety of languages and cultures. TM and TMS systems can reduce rework for translators and standardise the use of terminologies, thus delivering higher quality translation in a shorter timeframe to enterprises. Moreover, these systems help translators achieve more efficient workflows, limit repetitive tasks and optimise resource utilisation. The two case studies on enterprises from the technology and healthcare sectors showcase how TM and TMS technologies can help save costs, cut down time-to-market, and maintain high translation quality and compliance standards. Ask any enterprise that operates on a global scale to list the challenges it faces in managing large database and linguistic diversity, and they are likely to have a list. There is no one-size-fits-all solution, but there are tools that can help. TM and TMS systems should be regarded as part of the broader suite of data management tools and be integrated with technologies such as artificial intelligence and cloud solutions. As global enterprises continue to expand, more data and terminologies will have to be managed, and existing tools may not be deployable in many regions. There is much to the success of TM and TMS, and it can't be achieved overnight.

References

[1] Rothwell, Andrew, et al. Translation tools and technologies. Routledge, 2023.

[2] Prandi, Bianca. Computer-assisted simultaneous interpreting: A cognitive-experimental study on terminology. Language Science Press, 2023.

[3] Bowker, Lynne. De-mystifying translation: Introducing translation to non-translators. Taylor & Francis, 2023.

[4] Gough, Joanna, et al. "Concurrent translation on collaborative platforms." Translation Spaces 12.1 (2023): 45-73.

[5] Anderson, Chad, Richard Baskerville, and Mala Kaul. "Managing compliance with privacy regulations through translation guardrails: A health information exchange case study." Information and Organization 33.1 (2023): 100455.

[6] Chiocchetti, Elena, Vesna Lušicky, and Tanja Wissik. "Multilingual legal terminology databases: Workflows and roles." Handbook of Terminology. John Benjamins, 2023. 458-484.

[7] Uekusa, Shinya, and Steve Matthewman. "Preparing multilingual disaster communication for the crises of tomorrow: A conceptual discussion." International journal of disaster risk reduction 87 (2023): 103589.

[8] Burner, Tony, and Christian Carlsen. "Teachers' multilingual beliefs and practices in English classrooms: A scoping review." Review of Education 11.2 (2023): e3407.

[9] Warburton, Kara. "Terminology management." Routledge encyclopedia of translation technology. Routledge, 2023. 750-765.

[10] Fiset, John, Devasheesh P. Bhave, and Nilotpal Jha. "The effects of language-related misunderstanding at work." Journal of Management 50.1 (2024): 347-379.