CHALLENGES AND STRATEGIES IN TECHNICAL TRANSLATION: BRIDGING LINGUISTIC PRECISION AND CONTEXTUAL UNDERSTANDING.

Nasrullaeva T.S.
Senior teacher, Samarkand State Institute Foreign Languages
contact: +998906558857
email:toz81@mail.ru

Abstract: This article explores the theoretical foundations and practical challenges associated with the translation of technical texts. It highlights the complexities inherent in translating domain-specific terminology, syntactic structures, and cultural nuances that affect the interpretation of technical information. Drawing from translation theories and case studies, the article examines how linguistic precision and contextual understanding are essential for achieving accurate and effective communication in specialized fields such as medicine, engineering, and information technology. The discussion also addresses the role of the translator's expertise, the importance of interdisciplinary collaboration, and the potential for machine translation tools to assist in technical translation. Ultimately, the article underscores the critical need for balancing fidelity to the source text with the target audience's readability and comprehension.

Key words: technical texts, technical translation, Computer-Assisted Translation, Digital tools, proofreading, Machine Translation, terminology databases, Artificial Intelligence.

ПРОБЛЕМЫ И СТРАТЕГИИ ТЕХНИЧЕСКОГО ПЕРЕВОДА: БАЛАНС МЕЖДУ ЛИНГВИСТИЧЕСКОЙ ТОЧНОСТЬЮ И ПОНИМАНИЕМ КОНТЕКСТА.

Аннотация: В статье рассматриваются теоретические основы и практические трудности, связанные с переводом технических текстов. Акцент сделан на сложностях, возникающих при переводе узкоспециализированной терминологии, синтаксических структур и культурных нюансов, которые влияют на интерпретацию технической информации. Опираясь на теории перевода и примеры из практики, автор исследует, как лингвистическая точность и понимание контекста играют ключевую роль в обеспечении точной и эффективной коммуникации в таких специализированных областях, как медицина, инженерия и информационные технологии. В обсуждении также поднимаются вопросы роли профессионализма переводчика, важности междисциплинарного сотрудничества и потенциала использования машинных

инструментов перевода при работе с техническими текстами. В итоге статья подчеркивает важность сохранения верности исходному тексту при учете читаемости и восприятия целевой аудитории.

Ключевые слова: Технические тексты, технический перевод, автоматизированный перевод (CAT), цифровые инструменты, редактура перевода, машинный перевод, терминологические базы данных, искусственный интеллект.

TEXNIK TARJIMADA MUAMMOLAR VA STRATEGIYALAR: LINGVISTIK ANIQLIK VA KONTEKSTUAL TUSHUNCHA O'RTASIDAGI BOG'LIQLIK.

Annotatsiya: Maqolada texnik matnlarni tarjima qilish bilan bog'liq nazariy asoslar va amaliy qiyinchiliklar ko'rib chiqiladi. Xususan, tor doiradagi ixtisoslashgan terminologiya, sintaktik tuzilmalar va texnik ma'lumotlarning talqiniga ta'sir ko'rsatadigan madaniy jihatlar tarjimada qanday murakkabliklar tug'dirishi muhokama qilinadi. Tarjima nazariyalari va amaliy misollarga tayangan holda, muallif lingvistik aniqlik va kontekstni tushunish texnika, tibbiyot va axborot texnologiyalari kabi maxsus sohalarda samarali muloqot uchun qanchalik muhim ekanligini o'rganadi. Shuningdek, maqolada tarjimon professialligining roli, fanlararo hamkorlikning ahamiyati va texnik matnlarni tarjima qilishda mashinaviy tarjima vositalaridan foydalanish imkoniyatlari muhokama qilinadi. Xulosa o'rnida maqola asl matnning mazmuniy sodiqligini saqlash bilan birga, uning o'qilishi va maqsadli auditoriya tomonidan qabul qilinishining muhimligini ta'kidlaydi.

Kalit so'zlar: Texnik matnlar, texnik tarjima, avtomatlashtirilgan tarjima (CAT), raqamli vositalar, tarjimani tahrirlash, mashina tarjimasi, terminologik ma'lumotlar bazasi, sun'iy intellekt.

Introduction. Translating technical texts involves unique linguistic and contextual challenges that distinguish it from other types of translation, focusing on accuracy, clarity, and functionality in conveying specialized knowledge. Technical texts, such as manuals, user guides, and scientific reports, require a precise, straightforward approach to ensure the intended meaning is conveyed without ambiguity. Scholars emphasize the need for strict adherence to terminology and uniform language use across a document. Consistent terminology is critical because even slight variations can cause confusion or misinterpretation, particularly in fields like engineering or medicine where technical terms carry specific, non-negotiable meanings. "Terminology databases and glossaries play an essential role in maintaining consistency, allowing translators to refer to approved terms and prevent discrepancies in the text" [Gouadec, 2007, 146].

Technical translation is difficult due to the complexity and specialized nature of the source material. A major challenge is accurately translating specialized terminology, as technical texts often contain field-specific jargon and acronyms. Translators must balance fidelity to the source text with the need for clarity. For example, translating "finite element

analysis" requires understanding its exact meaning and relevance in engineering. Misinterpreting or inconsistently applying terms can lead to errors.

Maintaining consistency throughout the translation is another challenge. Technical documents often use repeated terminology and standardized phrases, which must remain uniform. "Inconsistent translation can confuse readers, especially in manuals or instructional texts. Translators rely on tools like terminology databases and translation memory software, but building and maintaining these resources requires significant effort and expertise. Cultural and linguistic differences add complexity. Measurements, units, symbols, and visual elements often need to be localized for the target audience" [Lederer, 1981, 72]For example, a document for an American audience may use inches and pounds, while one for European readers would use centimetres and kilograms. Translators must accurately convert these elements while considering cultural nuances. Formatting styles, such as the use of decimals and commas in numerical data, also vary and must be adapted. The translator must ensure that numerical data are presented in formats familiar to the target audience, such as commas versus decimal points [Mossop, 2014, 156].

Subject-matter expertise is crucial. Technical translators must have a deep understanding of the specific field to accurately interpret and render complex concepts. For example, translating medical texts requires knowledge of anatomy, pharmaceutical terminology, and medical procedures, while translating software documentation demands knowledge of programming languages and technical workflows. Without this expertise, translators may struggle to grasp the intricacies of the source material, leading to errors or omissions.

Adapting the syntactical structure of technical texts is also challenging. Technical documents are typically written in a clear and concise manner, often with short sentences and straightforward syntax. However, some languages favor more complex sentence structures or different word orders, making it challenging to retain the same level of clarity in translation. Translators must balance maintaining the simplicity of the original text and adhering to the grammatical and stylistic norms of the target language.

Materials and methods. Technical texts often include visual elements such as diagrams, charts, and tables, which must be carefully integrated into the translation process. Translators must ensure that captions, labels, and annotations are accurately translated while maintaining the visual alignment and design of the document. This requires collaboration with graphic designers or technical writers, adding another layer of complexity to the translation process.

Legal and regulatory considerations add complexity to technical translation. Many technical documents, like user manuals or safety instructions, must comply with specific standards and regulations in the target country. Engaging translators who understand both the technical subject matter and the legal requirements of the target country is crucial for ensuring regulatory compliance. Collaborating with legal experts familiar with local regulations can provide additional guidance and oversight. A thorough review process involving native speakers

and subject matter experts can help identify and address potential compliance issues before finalizing the document.

For example, translating medical device documentation requires adherence to strict regulatory frameworks, such as those set by the FDA in the United States or the EMA in Europe. Deviating from these standards could result in legal penalties, product recalls, or safety risks for end-users. Tight deadlines and high expectations for accuracy often create additional pressure for technical translators. Technical texts are frequently updated to reflect advancements in technology or changes in industry standards, requiring translators to work quickly while maintaining precision. This is especially challenging when dealing with large volumes of text or collaborating on projects with multiple translators, where maintaining consistency and meeting deadlines becomes a logistical challenge.

Technical translation involves several challenges due to its complexity, precision, and specialized nature. Accurate translation of specialized terminology is a significant challenge, as technical texts are often filled with field-specific jargon, acronyms, and abbreviations that may not have direct equivalents in the target language. Translators must balance fidelity to the source text with the need for clarity. For example, translating "finite element analysis" requires understanding its exact meaning and relevance in engineering. Misinterpreting or inconsistently applying such terms can lead to errors that compromise the document's usability.

Ensuring consistency throughout the translation is another major challenge. Technical documents often use repeated terminology and standardized phrases that must remain uniform to maintain clarity and coherence. Inconsistent translation of terms can confuse readers, especially in manuals or instructional texts. Translators often rely on tools like terminology databases, translation memory software, and glossaries. However, building and maintaining these resources requires significant effort and domain expertise, which may not always be readily available. Cultural and linguistic differences add another layer of complexity to technical translation. Measurements, units, symbols, and visual elements often need to be localized to align with the conventions of the target audience. For example, a document for an American audience may use inches and pounds, while one for European readers would use centimetres and kilograms. Translators must accurately convert these elements while considering cultural nuances that might affect comprehension. Additionally, formatting styles, such as the use of decimals and commas in numerical data, vary across regions and must be adapted accordingly. Cultural adaptation is a significant challenge in technical translation, as translators must align the content with the practical norms of the target region [Chesterman, 1997, 83].

Subject-matter expertise is another significant challenge. Unlike general translators, technical translators must have a deep understanding of the specific field to accurately interpret and render complex concepts. For example, translating medical texts requires familiarity with anatomy, pharmaceutical terminology, and medical procedures, while translating software documentation demands knowledge of programming languages and technical workflows.

Without this expertise, translators may struggle to grasp the intricacies of the source material, leading to errors or omissions.

Adapting the syntactical structure of technical texts also poses difficulties. Technical documents are typically written in a clear and concise manner, often with short sentences and straightforward syntax. However, some languages naturally favour more complex sentence structures or different word orders, making it challenging to retain the same level of clarity in translation. Translators must strike a balance between maintaining the simplicity of the original text and adhering to the grammatical and stylistic norms of the target language. Moreover, technical texts often include visual elements such as diagrams, charts, and tables, which must be carefully integrated into the translation process. Translators must ensure that captions, labels, and annotations are accurately translated while maintaining the visual alignment and design of the document. This requires collaboration with graphic designers or technical writers, adding another layer of complexity to the translation process.

Legal and regulatory considerations further complicate technical translation. Translators must be aware of specific legal terminology and compliance requirements that differ between countries, as inaccuracies can lead to legal disputes or violations. For instance, translating patent documents necessitates a precise understanding of intellectual property laws, which vary significantly across jurisdictions. Additionally, technical translators working on safety manuals or product documentation must ensure that all instructions and warnings are accurately conveyed to meet local regulatory standards, protecting both the company and end-users from potential liability. To handle large volumes of text efficiently, translators can utilize computer-assisted translation (CAT) tools that store previously translated segments and suggest them when similar text appears. Implementing a centralized translation memory system allows multiple translators to access consistent terminology and phrasing across different parts of the project. Breaking down the project into manageable sections and assigning them to specialized translators can help streamline the process and ensure high-quality translations.

The key challenges in technical translation include handling specialized terminology, ensuring consistency, addressing cultural and linguistic differences, acquiring subject-matter expertise, adapting syntactical structures, integrating visual elements, complying with legal and regulatory requirements, and managing time constraints. These challenges highlight the demanding nature of technical translation and the critical role of skilled translators who possess both linguistic proficiency and technical knowledge. By addressing these challenges effectively, translators contribute to the accurate and accessible dissemination of technical knowledge across languages and cultures.

Overcoming challenges in technical translation often involves a combination of advanced skills, specialized tools, and strategic methods. One effective strategy is the use of Computer-Assisted Translation (CAT) tools, which support translators in maintaining consistency and accuracy. These tools store previously translated segments, terminology databases, and glossaries, helping ensure uniformity in language and style throughout large projects. For

example, in the software industry, CAT tools ensure consistent translation of recurring terms like "user interface" or "settings menu" across manuals or application interfaces. However, while these tools enhance efficiency, they require careful human oversight to avoid errors or misused terminology.

Collaboration also plays a vital role in addressing the complexities of technical translation. Translators frequently work with subject-matter experts (SMEs) to clarify complex ideas or verify specialized terminology. For instance, when translating an aerospace engineering manual, a translator might consult an engineer to confirm the accurate interpretation of technical terms or procedures. This collaboration ensures that the translation is both linguistically precise and technically reliable, aligning with the practical application of the source material.

Ongoing learning and professional development are essential for technical translators to keep up with rapid technological advancements. Staying updated on industry developments might involve attending workshops, reading scholarly articles, or engaging with professional organizations. For example, a medical translator may follow updates in medical journals or regulatory changes to ensure their work remains accurate and compliant. By staying informed, translators can effectively manage challenges related to new terminology, concepts, or standards.

Quality assurance is another critical step in technical translation. Proofreading and editing by a second linguist or subject-matter expert help catch errors, ensure consistency, and polish the translation. Many technical projects also include rigorous testing, such as functionality testing for software documentation or usability testing for user manuals. These processes identify issues like unclear instructions or formatting problems, ensuring the final product meets the audience's needs.

The integration of Artificial Intelligence (AI) and Machine Translation (MT) is also transforming technical translation workflows. While AI-powered neural machine translation engines can speed up the translation of repetitive or structured text, they are not yet adept at handling the complexities of technical documents on their own. A hybrid approach, combining machine translation with human expertise, is often more effective. For example, translators may use MT to create a draft and then refine it for technical accuracy and contextual relevance. This approach allows translators to manage large volumes of text more efficiently without compromising quality.

Results and discussion. Finally, understanding the end-user's needs is key to successful technical translation. The usability of a technical document depends on how well it meets the target audience's expectations. Translators must consider factors like the audience's expertise, cultural context, and specific needs. For example, a user manual for a consumer electronic device might require simple language and clear, step-by-step instructions, while a nanotechnology research paper would demand detailed explanations and advanced terminology for a specialized audience. By tailoring translations to the intended users, technical translators ensure the document fulfils its purpose—whether to educate, inform, or instruct.

The key challenges in technical translation are multifaceted, encompassing linguistic, cultural, and contextual issues that can complicate the process of rendering highly specialized texts from one language to another. These challenges are widely recognized by both Uzbek and foreign scholars, who have explored various aspects of technical translation, from terminology management to the adaptation of content for different audiences. Understanding these challenges requires a deep appreciation of the nature of technical writing itself, which prioritizes accuracy, clarity, and precision.

One of the primary challenges in technical translation is the handling of specialized terminology. Both Uzbek scholars such as A. R. Ismailov and foreign scholars like Peter Newmark and Eugene Nida emphasize that technical texts often rely on precise and field-specific vocabulary. The translation of such terms can be particularly problematic when there is no direct equivalent in the target language. Ismailov highlights that in the case of technical texts in Uzbek, there is sometimes a lack of established terms for modern technological concepts, leading translators to either borrow terms from other languages or create new ones. Newmark, in his discussion of technical translation, concurs that one of the most difficult aspects of the process is ensuring that the technical meaning of terms is accurately preserved, especially when dealing with specialized fields like engineering, medicine, or information technology. The challenge becomes even more pronounced when terms are used in different ways in the source and target languages, which can result in misinterpretations if not handled correctly.

A second significant challenge is the need to maintain the consistency and coherence of technical language throughout the translation. T. A. van Dijk's research on specialized discourse points to the importance of consistency in technical texts, as inconsistency can lead to confusion or errors in interpretation. This challenge is further compounded by the fact that technical texts are often composed of highly structured, formulaic language. Uzbek scholars, including M. A. Karimov, argue that this structure must be carefully preserved in translation to maintain the logical flow and clarity of the original text. The translator must ensure that terms are used consistently and that the technical content remains easily comprehensible for the target audience. The challenge is particularly evident when dealing with lengthy or complex technical documents, such as manuals, scientific papers, or patents, where any inconsistencies in terminology or structure can affect the understanding of the entire document.

Cultural differences also present a substantial challenge in technical translation. While technical texts are often regarded as objective and factual, they are still subject to cultural influences in terms of language use and communication styles. For example, R. N. Akhmedov notes that in Uzbek technical texts, the emphasis on certain linguistic structures or idiomatic expressions may differ from those used in the source language, especially in technical writing rooted in different cultural traditions. This issue becomes more pronounced when translating between languages with distinct grammatical structures, such as English and Uzbek. Moreover, while technical texts aim for objectivity, they still reflect the norms and expectations of the

target culture in terms of presentation, style, and formatting. Translators must navigate these cultural aspects while ensuring that the technical content remains accurate and appropriately adapted for the target audience.

Another key challenge in technical translation is the need to interpret complex technical concepts that may not have a one-to-one equivalent in the target language. This is particularly problematic when translating advanced scientific or technological texts where new terms and concepts may have been introduced in the source language. "When translating emerging technologies or innovations, the translator often needs to employ creativity, either by coining new terms or providing detailed explanations, to ensure that the target audience understands the underlying concepts" [Karimov M. A., 2018, 215]. This requires not only linguistic expertise but also a deep understanding of the subject matter. Scholars like Nida emphasize that translation involves much more than replacing words—it involves recontextualizing complex concepts and ensuring that the core meaning remains unchanged. Translators must thus strike a balance between linguistic accuracy and conceptual clarity.

The rapid pace of technological development also presents a challenge for technical translation. As new fields and innovations emerge, translators must keep up with the latest developments in both language and technology. This often requires continual learning and adaptation. Uzbek scholars, such as S. T. To'raqulov, have noted that the fast-evolving nature of fields like information technology and biotechnology means that technical translators must stay current with new terms and practices. The use of machine translation tools, while helpful in some instances, is not always sufficient to capture the nuances of these emerging fields. To'raqulov cautions that while digital tools may aid in efficiency, they cannot replace the expertise required to ensure the accuracy and clarity of highly specialized translations.

Additionally, technical translation often involves dealing with complex sentence structures and syntactic patterns. Technical texts, especially in languages like English, can have long and intricate sentence constructions with embedded clauses and specific syntactical rules that may not easily translate into other languages. This challenge is further complicated when translating between languages with different syntactic orders, such as English and Uzbek, which have distinct subject-verb-object structures. According to M. A. Karimov, the translator must carefully restructure sentences to preserve the meaning while maintaining the integrity of the original content. Achieving this balance requires deep linguistic knowledge and careful attention to sentence construction.

Conclusion. Finally, the increasing reliance on digital tools in technical translation, such as computer-assisted translation (CAT) tools and machine translation, presents both advantages and limitations. While these tools can improve translation efficiency, they may not always handle the specialized and nuanced nature of technical texts well. Foreign scholars like Swales and Dry acknowledge that automated systems, while improving over time, still struggle with context, idiomatic expressions, and specialized terminology. Uzbek researchers, such as R. N. Akhmedov, also point out that the lack of standardized technical resources in the Uzbek

language exacerbates these issues. The reliance on machine translation tools without the involvement of expert translators can lead to errors in meaning and accuracy, particularly when dealing with complex or highly technical subjects.

In conclusion, the key challenges in technical translation encompass a wide range of issues, from managing specialized terminology and ensuring consistency to navigating cultural differences and interpreting complex concepts. Scholars both from Uzbekistan and abroad agree that successful technical translation requires not only linguistic proficiency but also subject-matter expertise and cultural awareness. The evolving nature of technology and the growing use of digital tools add further complexity to the process, making it essential for translators to continuously update their knowledge and skills to keep pace with these changes.

BIBLIOGRAPHY:

1. Gouadec D., "Translation as a Profession". – Amsterdam/Philadelphia: John Benjamins Publishing Company, 2007. – p350-370.

2. Karimov M. A., "Stylistic Features in Technical Translation". – Tashkent: TechLit Press, 2018. – p200-220.

3. Chesterman A., "Memes of Translation: The Spread of Ideas in Translation Theory". – Amsterdam/Philadelphia: John Benjamins Publishing Company, 1997. – p120-130.

4. Gouadec D., "Translation as a Profession". – Amsterdam/Philadelphia: John Benjamins Publishing Company, 2007. – p350-370

5. Lederer M., "La traduction simultanée. Expérience et théorie". – Paris: Minard, 1981. – p50-60.

6. Karimov M. A., "Stylistic Features in Technical Translation". – Tashkent: TechLit Press, 2018. – p200-220.

7. 60. Newmark P., "A Textbook of Translation". – London: Prentice Hall, 1988. – p150-165

8. Nida E. A., "The Theory and Practice of Translation". – Leiden: Brill, 1969. – p120-135.

9. Akhmedov R. N., "Development of Technical Vocabulary in Uzbek". – Tashkent: Academic Publishers, 2020. – p150-160.

10. Turaqulov S. T., "Translation Theory: Challenges in Lexical Precision". – Tashkent: UzScience, 2015. – p100-115.