COMPARATIVE ANALYSIS OF INFORMATION TECHNOLOGY TEXT TRANSLATIONS BETWEEN ENGLISH AND UZBEK

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Abstract. This study offers a comparative analysis of Information Technology (IT) text translation between English and Uzbek, focusing on direction-specific challenges and strategies in English-Uzbek (E-U) and Uzbek-English (U-E) workflows. Drawing on literature and illustrative examples, the paper shows that E-U translation is characterized by terminology non-equivalence, the need to coin or standardize neologisms, and extensive syntactic re-structuring to fit Uzbek's agglutinative morphology. Translators frequently combine borrowing, calque, and paraphrase, and engage in explicitation (e.g., unpacking compound noun phrases and clarifying acronyms) to maintain clarity and accessibility. In contrast, U-E translation benefits from a rich, standardized English technical lexicon but poses stylistic and idiomatic challenges, especially for translators working into an L2. Here, successful practice hinges on normalization and implicitation—condensing circumlocutory Uzbek descriptions into concise English technical terms (e.g., rendering *bulutga joylashtirish* as "cloud deployment") – alongside rigorous terminological consistency. Across both directions, results underscore the centrality of domain knowledge, terminology management, and audience-aware choices. The discussion situates these findings within directionality research, arguing that with training and editorial workflows, high-quality output is attainable in both directions. The paper concludes with practical implications for translator training in term creation (E-U) and idiomatic polishing (U-E), highlighting how improved practices can enhance cross-lingual access to IT knowledge.

Keywords: English–Uzbek translation; IT terminology; directionality; explicitation and implicitation; term formation and standardization; idiomaticity; normalization; technical communication; bilingual lexicography; translation workflow.

INTRODUCTION. English and Uzbek represent two very different linguistic systems – English is an analytic Indo-European language with relatively fixed word order, whereas Uzbek is an agglutinative Turkic language with rich morphology and more flexible syntax. These fundamental differences pose significant challenges for translation of specialized texts, such as those in the domain of information technology

(IT). Notably, many modern IT terms originated in English and often lack established equivalents in Uzbek. For example, early on terms like "software," "cloud computing," and "smartphone" had no standardized Uzbek counterparts, requiring translators to either adopt transliterations (e.g. *smartfon* for "smartphone") or coin new phrases (e.g. *aqlli telefon*, literally "smart telephone") to convey the meaning [1, p. 177–178]. Conversely, when translating from Uzbek into English, the target language already dominates the IT domain, but translators face the task of producing idiomatic English text, often working from Uzbek originals that may use descriptive phrasing instead of technical terminology. Complicating matters, many translation projects involve inverse translation – translating into a non-native language. Traditionally, translation theorists maintained that translators should work only into their first language (L1) for optimal quality, viewing translation into a second language (L2) as inherently prone to error [2, p. 1–2]. This prescriptive view is reflected in industry practice where agencies often advertise "native translator" guarantees. However, in settings like Uzbekistan, practical necessity dictates that many professionals must translate both from English to Uzbek and from Uzbek to English, due to the relative scarcity of native English translators with advanced Uzbek skills. Recent research suggests that professional translators can achieve high-quality results in both directions. For instance, Hunziker Heeb (2016) found no substantial differences in the self-concepts or general approaches of translators working into L1 versus L2, indicating that with sufficient training and experience, L2 translation can be performed at a professional standard [3, p. 84]. In this context, a systematic comparison of English–Uzbek vs. Uzbek–English IT translation is valuable for identifying direction-specific challenges and effective strategies.

Aim of the study: Building on the above insights, this study aims to compare the linguistic and technical issues that arise in translating IT texts between English and Uzbek in both directions. We investigate how translators handle terminological gaps, structural differences, and stylistic requirements when going from English to Uzbek (E→U) versus from Uzbek to English (U→E). By highlighting the distinct hurdles and techniques in each case, the study seeks to inform best practices for translators and contribute to translation studies on lesser-studied language pairs like English–Uzbek.

METHODS. This research employed a comparative qualitative analysis of English–Uzbek IT translations in both directions. The analysis combined a review of relevant literature with examination of actual translation examples drawn from technical texts and translator practice. First, we gathered a sample of IT-related source texts and their translations: for English-to-Uzbek, sources included software documentation, technical

manuals, and computing glossaries; for Uzbek-to-English, sources included Uzbek-authored IT articles and user guides. We also consulted established bilingual terminology resources (for example, an English–Uzbek computing glossary by Khakimov) to identify official equivalents or prevalent translations of technical terms. Each sample translation was analyzed to determine how key challenges were addressed. In particular, we focused on: (1) Terminology equivalence – how translators dealt with English IT terms lacking Uzbek equivalents and vice versa; (2) Syntactic adjustments – how English nominal compounds or other structures were transformed to fit Uzbek grammar, and how Uzbek grammatical constructions were rendered into fluent English; and (3) Pragmatic and stylistic choices – such as handling of culture-specific references, tone, and formality in the two languages.

We categorized the translation strategies observed in the corpus using standard terminology from translation studies. Key strategies for lexical gaps included borrowing (direct use of the source term), calque or literal translation, and paraphrasing the concept in the target language. For structural issues, we noted instances of sentence restructuring, addition of explanatory phrases, or omission of redundant elements. To supplement the textual analysis, we drew on findings from prior studies of English–Uzbek translation. In particular, Aripova's recent study on technical neologisms [1] provided insights into common issues and solutions in English-to-Uzbek translation, while research on translation directionality (e.g. Campbell 1998; Hunziker Heeb 2016) informed our understanding of how working into L2 might affect the translation process. Throughout the analysis, we ensured that any use of Uzbek terms in our examples was accompanied by an English gloss or explanation for clarity. The outcome of this methodology is a set of comparative observations on E→U and U→E translation challenges, supported by concrete examples from the data.

RESULTS. English-to-Uzbek Translation: The translation of IT texts from English into Uzbek revealed several prominent challenges. A primary issue is terminology non-equivalence. As noted, many technical terms in English do not have pre-existing one-word counterparts in Uzbek [1, p. 177–178]. Translators therefore resort to a range of solutions. One common approach is borrowing the English term, either by inserting it in the Latin script or adapting it to Uzbek phonology. For instance, "database" is often rendered as *bazavoy ma'lumotlar* or simply *database* in Uzbek texts, and *kompyuter*, *printer*, *skanner* (computer, printer, scanner) are routinely used as direct loans in Uzbek IT discourse. In other cases, translators create neologisms or calques. For example, "cloud computing" has been translated literally as *bulutli hisoblash texnologiyalari* (literally, "cloud computing technologies"), aligning with Uzbek morphological

patterns, though in practice some translations still prefer to retain the English term *cloud computing* for familiarity. Similarly, "smartphone" entered Uzbek as *smartfon* (a straightforward transliteration), while linguistic purists have proposed the calque *aqlli telefon* ("smart telephone") as a more transparent alternative [1, p. 178]. Each option has implications: using the English loanword can improve precision and international comprehensibility, whereas a calque or descriptive term can make the concept more accessible to Uzbek speakers unfamiliar with the English term. We observed that paraphrase is another frequently used strategy to handle missing equivalents. Instead of a one-to-one translation, translators often explain the meaning of a term in Uzbek words. Indeed, analysis of our corpus indicates that paraphrasing using unrelated words or definitions was one of the most frequent methods for conveying the sense of novel English terms. For example, the English word "hotspot" (in networking context) might be translated as *simsiz internet nuqtasi*, literally "wireless internet point," fully describing the function of a hotspot rather than attempting a direct lexical substitute. This strategy ensures comprehension at the expense of brevity. Its prevalence underscores the translators' adaptive role in expanding Uzbek scientific vocabulary by explanation.

Beyond terminology, syntactic and grammatical adjustments are crucial in E→U translation. English technical texts often feature complex noun phrases and compound terms (e.g. "access point configuration settings") that do not map neatly onto Uzbek structure. Uzbek generally requires such compounds to be unpacked and reorganized according to its modifier–head ordering and agglutinative suffixation. Our analysis confirms that translators frequently reorder components and add linking words to achieve a natural Uzbek sentence. As Aripova (2025) highlights, an English multi-word term may need significant restructuring to convey the meaning in Uzbek [1, p. 178]. For instance, a phrase like "peer-to-peer network" cannot be translated word-for-word in the original English sequence; instead, an Uzbek translator might render it as *tenglar o'rtasidagi tarmoq*, which literally means "network among equals." Here, the English compound "peer-to-peer" is expressed by introducing the relational phrase *o'rtasidagi* ("among") and changing the word order, illustrating explicitation – spelling out the relationship that English leaves implicit. Without such adjustments, a direct translation would sound unnatural or be confusing in Uzbek. We also observed translators adding clarifying words for technical acronyms or shorthand. For example, "RAM usage" might be translated with an explanatory phrase as *tezkor xotira foydalanilishi* (literally "operational memory usage"), since simply transliterating "RAM" may not communicate meaning to all readers. These findings align with known

differences in English and Uzbek grammar: what English packs into compact noun clusters, Uzbek often needs to unpack into longer constructions or clauses.

Effective handling of terminology and syntax in E→U translation often involves a mix of strategies. Consider the following example illustrating different approaches:

- *Source (English):* "The software update failed due to a network authentication error."
- *Translation 1 (Uzbek): Dasturiy yangilanish tarmoq autentifikatsiyasi xatosi tufayli muvaffaqiyatsiz tugadi.*

(Back-translation: "The software update ended unsuccessfully due to a network authentication error.")

- *Translation 2 (Uzbek): Tarmoqni tekshirish (autentifikatsiya) xatosi tufayli dastur yangilanishi o'tmedi.*

(Back-translation: "Due to a network verification (authentication) error, the program update did not go through.")

Both Uzbek versions convey the overall meaning, but their strategies differ. Translation 1 closely mirrors the English technical terms: *dasturiy yangilanish* is a calque for "software update" (using *dasturiy* "pertaining to software" + *yangilanish* "update"), and *autentifikatsiya* is a direct loan for "authentication." The sentence structure is adjusted for Uzbek, but the terminology remains concise and borrowed (*autentifikatsiya* being an assimilated technical term). In contrast, Translation 2 opts to explain the term "authentication" by the phrase *tarmoqni tekshirish* ("network verification") and places the English term in parentheses as a gloss. This version also slightly reorders the sentence for clarity (putting the cause at the beginning) and uses a more idiomatic expression *o'tmedi* ("did not go through") to describe the failure, instead of a direct translation of "failed." The first translation is more compact and would appeal to readers with IT background who are comfortable with loanwords, whereas the second translation is more verbose but potentially clearer to lay readers. Such examples illustrate the translator's decision-making: when faced with a term like "authentication" that might be unfamiliar in Uzbek, they must choose between brevity (using the loanword) and clarity (providing an explanation). Our corpus showed translators sometimes using a hybrid approach – e.g., introducing a new term with an explanation on first occurrence (*"ma'lumotlar bazasi (database)"*) to both educate the reader and maintain precision.

Another subtle challenge in E→U translation involves cultural and connotative nuances. While IT content is largely technical, some English terms carry connotations that might not directly transfer to Uzbek. A case in point is the word "hacker." In

English, "hacker" often has a negative connotation (implying an illicit or skilled malicious intruder), whereas a direct transliteration *xaker* in Uzbek might be interpreted more neutrally as simply an expert or someone proficient with computers. If an English text refers to "hackers" in a security context, an uninformed Uzbek reader might not grasp the negative intent. To bridge this gap, translators may add qualifiers in Uzbek. For example, *xavfli xaker* ("malicious/dangerous hacker") can be used to explicitly convey the negative aspect [1, p. 178]. This adjustment ensures the pragmatic meaning – the intended impression of the term – is preserved, not just the basic referential meaning. Overall, translating from English to Uzbek requires not only converting technical content but also localizing it: adapting new terms into the Uzbek lexicon, clarifying implicit meanings, and making the text accessible for the target audience's linguistic and cultural context.

Uzbek-to-English Translation: Translating IT texts from Uzbek into English presented a somewhat different profile of challenges. On one hand, English as a target language offers a rich, standardized technical vocabulary, meaning there is usually an established equivalent for any given concept. Indeed, many technical terms used in Uzbek IT materials turn out to be borrowings or calques from English in the first place (often introduced via Russian). In our dataset, we found numerous instances where the Uzbek source term was essentially derived from English, which simplified the translator's job. For example, Uzbek sentences discussing *dasturiy ta'minot* readily map to "software," *sun'iy intellekt* to "artificial intelligence," and *kompyuter tarmog'i* to "computer network" with a one-to-one correspondence. In cases where Uzbek IT writers have diligently used standardized terminology, the translation process can be almost straightforward substitution. Glossaries and technical dictionaries are valuable here: a translator cross-referencing *ma'lumotlar bazasi* will quickly confirm it should be translated as "database," and so on. The primary task becomes ensuring consistency and choosing the preferred English term among possible synonyms. Resources such as bilingual IT dictionaries (e.g., Khakimov's English–Uzbek glossary) help verify that terms like *ilova* are rendered as "application" (or "app") and *bildirishnoma* as "notification," matching industry usage.

However, Uzbek-to-English translation is not always trivial. One significant challenge arises when the Uzbek source uses an explanatory or circumlocutory expression in place of a concise technical term. This often happens if the English term was not widely known in Uzbek at the time of writing, or if the author intentionally avoided foreign borrowings. As a result, the translator must interpret the description and infer the standard English term that encapsulates that meaning. For example, an Uzbek text

might say *dasturiy vositalarning bulutga joylashtirilishi* – literally, "the placement of software tools onto the cloud." A direct, literal translation of this phrase into English would be clunky and non-standard. The challenge for the translator is to recognize that this phrase describes the concept of "cloud deployment." The appropriate English rendition would thus be: "the software tools were deployed to the cloud," or simply using the noun form "cloud deployment," rather than a wordy literal translation. In doing so, the translator performs an implicitation, replacing an explicit descriptive phrase with the concise technical term expected in English. Our analysis noted this pattern frequently: where an English-to-Uzbek translator might have to add words to explain a term, the Uzbek-to-English translator often has to condense or substitute a definitive term for a drawn-out description. This flip in approach is essentially an inversion of the E→U scenario. It requires the translator to have a solid grasp of the underlying concept so that nothing is lost in translation except unnecessary verbosity. In the above example, introducing the term "deployment" in the English translation actually elevates the technical register and aligns with English technical style, provided the context supports that interpretation. Such shifts from explicit to implicit correspondences are acceptable and even expected as long as the meaning is accurately conveyed and the resulting English text reads naturally to the target audience.

Another challenge in U→E translation relates to style and idiomaticity. Because of the translator demographics, many Uzbek-to-English technical translations are produced by translators for whom English is a second language (L2). The source comprehension may be strong (since they are often native Uzbek speakers fully understanding the original), but producing polished technical English can be demanding. A common symptom we observed is translations that are literal and grammatically correct, yet subtly non-idiomatic to a native reader. For instance, consider the Uzbek sentence *"dastur yangilanishi muvaffaqiyatsiz yakunlandi."* A word-for-word translation would be *"The program update finished unsuccessfully."* While not incorrect, this phrasing is not the way a native English IT professional would typically describe the situation. A more natural English rendition is *"The software update failed."* The literal translation (*finished unsuccessfully*) reflects Uzbek phrasing and echoes the source structure, but it lacks the concise idiomatic punch of the English expression *to fail*. Such differences in collocation and style are often only evident to a native or near-native ear. Our findings are in line with the general concern that L2 translations may exhibit slight awkwardness or overly formal tone. In professional practice, therefore, Uzbek-to-English IT translations often undergo careful editing by native English editors or advanced bilingual specialists to polish the text. This extra revision step helps

catch unnatural phrasing, adjust word choice (e.g., preferring "failed" over "finished unsuccessfully"), and ensure the tone meets the expectations of English technical documentation (which tends to prioritize clarity and brevity). It is worth noting, however, that many Uzbek translators with strong command of English can and do produce high-quality translations. As they gain experience, especially by working with parallel texts and industry standards, they internalize the typical English idioms and preferred terminology. For example, an experienced translator will know to translate *yomon dastur* as "malware" rather than a literal "bad program," and *draiver* (a loanword for driver software) simply as "driver." Mastery of such terminology, often aided by consulting large English corpora or translation memory systems, allows L2 translators to approach near-native fluency in specialized contexts.

Cultural and contextual adaptation is generally less problematic in U→E translation because the content of IT texts is fairly universal. Yet, there are instances where local flavor must be handled. If an Uzbek text uses a culturally specific metaphor or anecdote, the translator must decide whether to retain it or replace it. For example, an Uzbek cybersecurity guide might describe a pristine data environment with a local proverb like *"ilon izi qolmagan joy,"* literally "a place untouched even by a snake's trail." While vivid in Uzbek, this phrase would likely confuse an international English audience if translated literally. The translator in this case would opt for a neutral description such as "a completely untouched section of data," sacrificing the colorful metaphor for a clear technical description. Such choices align with English technical writing conventions that favor directness over figurative language. Overall, the U→E direction benefits from the wealth of established terminology and a conventionally direct style in English, but it challenges the translator to produce a text that does not read like a translation. Achieving this often involves normalization – rendering the content in the form an English reader expects, even if it means reordering information or using an English technical term in place of an explicative source phrase. Consistency is also paramount: if an Uzbek text uses a term consistently, the translator should likewise use a single English equivalent consistently. For example, if *zaxira nusxa* appears repeatedly in the source, it should be translated uniformly as "backup" (or "backup copy") each time, rather than fluctuating between synonyms. Likewise, an Uzbek term like *ilova* should not be translated as "app" in one sentence and "application" in another without good reason – a single choice should be made to avoid confusion. Our observations underscore that U→E translators must perform nuanced tasks: interpret the sometimes implicit or verbose source material, find the correct

technical terms in English, and craft a fluent narrative that reads as if originally written in English.

DISCUSSION. The comparative results demonstrate a clear asymmetry between the two translation directions, with each posing almost inverse problems. This confirms a long-recognized notion in translation studies: translating into a less technologically developed or resource-rich language (English→Uzbek) often demands *expansion* and *explicitation*, whereas translating into a globally dominant language (Uzbek→English) involves *condensation* and *conventionalization*. In essence, the difficulties are the mirror image of each other. Campbell's inverse translation model articulated this duality: when working from an L2 into one's native L1, the greater challenge lies in fully understanding and decoding the source text, while expression in the mother tongue is relatively easier; conversely, when working into an L2, comprehending the source is straightforward, but producing a natural target text is the hard part [2, p. 57]. Our findings align with this model. In E→U translation, translators struggle primarily with comprehension-equivalence issues – figuring out or inventing terms for unfamiliar concepts and making the text make sense in Uzbek. In U→E translation, understanding the source is usually direct (especially since many terms are borrowed), but the effort shifts to crafting an idiomatic and precise English rendition.

Despite these contrasting challenges, our analysis also highlights several common principles that hold true in both directions. One is the critical importance of terminological consistency and accuracy. Regardless of direction, a high-quality translation ensures that each technical term is translated the same way throughout the text and in accordance with any existing standards or glossaries. Inconsistencies (e.g., translating the same Uzbek term *ilova* as "application" in one place and "attachment" in another, or an English term like "server" alternately as *server* and *qabul qiluvchi*) can confuse the reader and undermine the professional tone. Both directions benefit greatly from the use of terminology management tools and reference materials to keep terminology uniform. Another shared aspect is the need for domain knowledge and research. The translator must often go beyond linguistic knowledge to understand the underlying technical concepts in order to translate them appropriately. This is where the translator effectively takes on the role of a terminologist. As Bowker (2002) observed, effective technical translators behave like terminologists – they devote effort to researching and memorizing the specialized lexicon of their field so that they can retrieve and apply the correct terms in the target language [4, p. 78]. Our study illustrates this point: whether it's coining a new word in Uzbek or choosing the exact right term in English, the translator's familiarity with IT terminology (and how new

terms are being used or standardized) directly impacts the translation quality. In practice, translators on both sides increasingly consult parallel texts, technical dictionaries, and even software localization guides (such as Microsoft's glossary) to validate their choices. This terminological diligence ensures that translations are not only internally consistent but also externally consistent with industry norms.

The differences in direction also carry practical implications for training and workflow. For English-to-Uzbek, translators and editors might prioritize developing new terminology and establishing clarity for the reader. This could involve collaboration with subject matter experts or terminologists to decide on translations for emerging terms (for example, agreeing whether *bulut* (cloud) concepts should be translated or left in English). It also involves sensitivity to the target readership – gauging when a loanword is acceptable or when an explanation is necessary. For Uzbek-to-English, additional emphasis should be placed on polishing language fluency. It is advisable for important Uzbek→English translations to be reviewed by a native English speaker or a bilingual editor with native proficiency, as an extra quality control step to catch any unnatural phrasing. This two-step approach (translation by a bilingual expert, followed by monolingual editing) can significantly enhance the readability of the final English text. At the same time, the trend noted by Hunziker Heeb – that many professionals can translate into L2 effectively [3, p. 84] – suggests that rigid native-only policies might be relaxed if translators receive proper training. Training programs for Uzbek translators should include modules on English technical writing style, common collocations, and frequent error patterns in L2 translation, thereby equipping translators to self-edit and approach native-like quality. Likewise, training for E→U translation should cover methods of term creation (drawing from linguistics and existing Uzbek word formation rules) and practice in restructuring English sentences into natural Uzbek forms.

Finally, the evolving nature of the IT field means that new challenges continually emerge in both directions. As technology advances, new English terminology enters usage (e.g. "cryptocurrency," "Internet of Things") which may not yet have Uzbek equivalents. Translators working E→U will continuously perform the balancing act of introducing such terms into Uzbek, whether through loans or inventive translations. Simultaneously, as Uzbek develops its scientific register, there may be instances where Uzbek technical discourse innovates or prefers certain expressions that are not direct copies of English. Future translators working U→E will need to stay attuned to the nuances of Uzbek tech language to accurately reflect them in English without loss of meaning. In both cases, the translator's role is not merely to replace words but to

mediate between languages and cultures, ensuring that the intent and technical content survive the journey between English and Uzbek. The comparative perspective in this study reinforces that successful translation is a complex decision-making process. Each direction has its unique mix of *linguistic*, *terminological*, and *cultural* adjustments, yet both ultimately strive for the same end: a text that conveys the original information accurately and readably for its intended audience.

CONCLUSION. In summary, translating IT texts between English and Uzbek is a bidirectional challenge characterized by complementary difficulties. Translation from English into Uzbek requires the translator to expand and explain: due to lexical gaps, one must often invent or adapt terminology and restructure English sentences to fit Uzbek's grammatical mold. The translator serves as a pioneer, enriching the Uzbek technical lexicon while making the text understandable for local readers. In contrast, translation from Uzbek into English demands condensation and refinement: the translator must render verbose descriptions into precise English technical terms and ensure the result reads idiomatically, often working outside their native language. Despite these differences, both directions benefit from rigorous terminology management, deep understanding of the subject matter, and careful attention to audience expectations. Consistency in term usage and clarity of expression are key indicators of quality in either direction. This comparative analysis has shown that rather than one direction being categorically "easier," each has its own set of hurdles that require different skills and strategies. By recognizing these specific needs, translators can better prepare themselves – for example, by developing creative term-coining skills for English-to-Uzbek work and honing their stylistic fluency for Uzbek-to-English tasks. As English–Uzbek translation activity grows (spurred by globalization and technological development in Uzbekistan), the insights from this study can inform translator training and practice. Ultimately, improving the quality of translations in both directions will facilitate more effective knowledge exchange and accessibility of IT content across the English and Uzbek languages. The English–Uzbek case also illustrates a broader point in translation studies: successful translation is not merely about linguistic conversion, but about problem-solving and adaptation to bridge differences between languages, technical domains, and cultures.

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