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РАЗДЕЛ II. СОПОСТАВИТЕЛЬНОЕ ЯЗЫКОЗНАНИЕ
SECTION II. COMPARATIVE LINGUISTICS

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Technological impact on the translation industry and beyond: perspectives of Russian translation professionals

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Abstract: Modern technical tools allow achieving high-quality translations in shorter time. According to some researchers and practitioners, a translator is turning into a highly qualified specialist, who is required to be proficient in the language and able to use technical tools. This phenomenon is called augmented translation by analogy with augmented reality. Undoubtedly, augmented translation becomes an everyday practice, and it will lead to massive changes in the translation market and will challenge those learning and already providing language services. The present study aims to identify the translation community's attitudes towards the changes associated with digitalization as well as the possible risks ensuing the technological developments. The research is framed as a qualitative exploration using interviews as a major tool to address the objective. Thirty-one professional translators of various ages, backgrounds, and experiences were interviewed to learn about their views on digitalization. We conclude that although the changes in the industry are significant, practicing translators demonstrate flexibility and the ability to adapt to changing conditions. That said, the implications of digitalization require an immediate response at the level of university training, translation agencies, businesses, and society at large. In general, decisions to introduce technology into the translation industry should be more balanced to avoid negative consequences for stakeholders.

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Влияние технологий на перевод и смежные отрасли: мнение отечественных профессиональных переводчиков

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Аннотация: Современные технологии позволяют выполнять качественные переводы в сжатые сроки. По мнению некоторых исследователей и участников рынка, переводчик превращается в специалиста, от которого требуется владение языком и умение пользоваться программным обеспечением. По аналогии с «дополненной реальностью» это явление получило наименование «дополненный перевод». С высокой долей вероятности дополненный перевод станет повсеместной практикой, что приведет к значительным изменениям на рынке переводов и бросит вызов и тем, кто только получает образование в этой сфере, и тем, кто уже оказывает языковые услуги. Цель настоящего исследования – выявить отношение переводческого сообщества к изменениям, связанным с цифровизацией, а также возможные риски, связанные с развитием технологий. Работа задумана как качественное исследование: в качестве основного инструмента для решения поставленной задачи было выбрано интервью. Всего был опрошен 31 профессиональный переводчик. В результате был сделан вывод, что, несмотря на значительные изменения в отрасли, практикующие переводчики демонстрируют гибкость и способность

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адаптироваться к меняющимся условиям цифровизации. При этом последствия технологического прогресса требуют немедленного реагирования на уровне университетской подготовки, переводческих агентств, бизнеса и всего общества. В целом решения о внедрении технологий в переводческую отрасль должны быть более взвешенными, чтобы избежать негативных последствий для названных участников переводческой отрасли.

Ключевые слова: переводческая отрасль, цифровизация, инструменты CAT, машинный перевод, память переводов, постредактирование машинного перевода, искусственный интеллект, большие языковые модели

1. INTRODUCTION AND MOTIVATION

Technological change pressures the global employment market, according to the World Economic Forum report on the future of jobs. Overall, 83 million jobs will be lost, while only 69 million will be created. This major shift is believed to happen in the next five years (Future of Jobs Report 2023/5, 2023). In this context, the news that the EU tests machine translation unsupervised by human translators may be a point of concern for the community of professionals (Sorgi, 2023).

Translation, while being a relatively common job, is often misunderstood. This intellectually-intensive labour requires lengthy training and an almost life-long commitment to learn to deliver a valid translation. However, the public is still largely unaware of the intricacies of the translation profession, and it may be assumed that automation will eventually replace human translators, leaving interlingual communication unmediated by human agents. Such beliefs do not seem uncommon, but the history of translation as an activity and profession proves that this sphere has survived multiple attempts to automate it, while translators have demonstrated outstanding resilience in adapting to changing environments.

The existing research and industry reports on digitalization of translation is far from conclusive either. On the one hand, business behind translation registers increased expenditures on and revenues from machine-translation post-editing (e.g., Memsource 2020). Researchers follow the suit: productivity of translators using machine translation is reported by Green et al. (2013), Almeida and O'Brian (2010), Sánchez Torron (2017) et al. On the other hand, businesses tend to support cheaper solutions, when possible, while methodologies behind research differ, and in studies where machine translation outcomes are evaluated quality-wise by humans, the e-translators are presented in a dimmer light (Läubli and Orrego-Carmona 2017; Pielmeier and Lommel 2021). Unresolved are also other issues, such as the impact on translation job market, cybersecurity of translation, translators' skills, and these issues are waiting to be investigated.

In this paper, we attempt to discover how digitalization affects translation labour. Specifically, we learn from the literature and translators about the effects of technology on the industry and elicit translators' projections on the future of this job. As a result, we arrive at conclusions about the degree of the job's resilience to technological advancements and any possible benefits and hazards as regarded by translators. To achieve our goal, we review the existing literature on the state of the art of technological impact on translation labour and then interview 31 translators.

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2. RESEARCH DESIGN

We approach this paper deductively: first, we provide an overview of the existing literature on how digitalization impacts the contemporary translation industry. Then, we interview 31 translators to hear the voices of those who understand and experience the consequences of digitalization every day.

Primarily, the review of literature addresses the scholarly and non-academic literature on the development of machine translation as a major technological impact on the industry, incorporates the existing statistics related to the industry and reflecting its trends, and relies on private opinions of the industry experts concerning the state of the art and future of translation.

Afterward, we demonstrate how interviews with translators map on the conclusions from the literature. Specifically, we asked 31 professional translators to share their opinions about the practical aspects of digitalization. Meanwhile, an interview is a qualitative method, and in most cases, its outcomes are not designed to be representative of the population. Therefore, to minimize the effects of the low generalizability of our results, we used purposive sampling to provide a most representative selection of opinions expressed by the translation professionals. We recruited translators of different ages, specializations, places of living, income sources, language specializations, and employment conditions to ensure diversity of the provided responses. Hence, the sample was meant to reflect diversity in terms of the following criteria:

1. *Age* is one of the primary characteristics of a respondent since it can impact the attitude to technological shifts (Elias et al., 2012). We established three age groups: 20-30, 30-45, and over 45, which is a choice linked to the *experience* translators in the industry tend to gain by certain ages. We hypothesized that more experienced professionals might offer a more balanced attitude to technology, while younger colleagues may suggest how the technological change might unfold.

2. *Target languages* the translators use professionally may influence their opinions on technological change, for instance, because rare languages are less likely to be supported by technological advancements.

3. *Specialization*, the topic the translator focuses on, such as medicine, is another factor we consider because translators with narrower specializations may be less affected by technological progress.

4. The information about the *primary source of income* is also collected from respondents: we hypothesized that if translation is not the primary income, the respondent would feel less apprehensive about their professional future. In the interview, we inquired if translation provides a less significant, substantial, or the only source of income.

5. *The type of employer* affects the translator's perception of the industry trends as well because translators communicate with stakeholders with varying requirements. In our case, we singled out three types of employers: a business/organization where translators are on the payroll, a translation agency that hires translators to provide linguistic services to multiple and diverse customers, and freelancing: translators make direct contracts with their customers and pay taxes.

6. *Geographical location* may significantly affect respondents' feedback. Therefore, we target a single country, Russia, where translators share a common business environment. Meanwhile, we are aware that business intensity may vary in different parts of the country, where the most visible gap is between the capital city of Moscow with the highest business concentration and other cities. We, thus, recruited participants from 16 cities, including the capital and the second busiest centre, Saint Petersburg.

The resulting sample consists of 31 translators representing a variety of contexts (Table 1). Specifically, we contacted a comparable number of representatives from the larger federal centres (Moscow and St. Petersburg) and smaller Russian cities. Two

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translators represented CIS (Commonwealth of Independent States) and non-CIS countries. We also relied primarily on translators aged between 30 and 45 (18 translators) with experience ranging from 6 to 20 years (19 translators) because such translators seem to be more knowledgeable about the current state of the industry than their younger and older colleagues, and they are likely to be more aware of the recent technological changes. Similarly, we prioritized translators who earn their living by translating (over 2/3 of respondents): such professionals are more motivated to think about their competitive advantages concerning technologies. Additionally, respondents are mostly freelancers (around 50%) because self-employed translators assume more responsibility for their success and tend to be more active. Finally, our respondents work with major translation languages and some rare languages, such as Estonian.

Table 1. Description of Translators Sample
Таблица 1. Описание выборки переводчиков

Parameter	Characteristics	Sample
City	Provincial	16
	Federal Centres	13
	CIS and non-CIS	2
Age, years	20-29	9
	30-45	18
	Over 45	4
Experience, years	1-5	9
	6-20	19
	Over 20	4
Target Languages	English, Chinese, Estonian, French, Italian, German, Spanish	
Specialization	Politics, economics, technical (incl. nuclear power, mining, oil and gas, forestry, instrumentation, agriculture), business, literature, psychology, finance, construction, Internet sales, promotion, marketing, culture, arts, chemistry, law, philosophy, research, real estate, medicine (incl. gynaecology, dentistry, pharmacology)	
Translation as primary income	No	11
	Yes	20
Employer type	Company	9
	Translation Agency	4
	Freelance	15
	Mixed (freelance and company/Translation Agency)	3

The interviews took place online through video conferencing technology. The respondents were informed that they take part in an anonymized survey about the impact of technology on translation. The interview was semi-structured and administered by all the authors separately in May 2024.

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3. TRANSLATION INDUSTRY UNDER DIGITALIZATION

Technological progress has influenced the translation industry primarily through instruments such as machine translation (MT) and translation memory (TM) embedded in computer-assisted translation software (CAT tools). While TMs and CAT tools are specifically dedicated to assisting translators, MTs target translators and the general public alike because they aim to accomplish automatic translation and replace translators at least partially. By now, these instruments have developed significantly, and they have tangibly changed the translation landscape. This section describes these technologies and synthesizes how field professionals discuss the technological impact on their work routine.

3.1. Translator's Extended Mind

The technology available to translators is diverse. We start this section with an overview of the available instruments. Specifically, we commence by addressing technologies such as translation memory (TM) and computer-assisted translation (CAT). The development of these aids has been overshadowed by the advancement of machine translation (Balashov, 2020), probably, because machine translation is widely available to the general public, while CAT/TM is often a proprietary technology intended for professional translators, a narrow group. However, CAT/TM represents an indispensable tool for translating, and its development story is compelling (e.g., see Hutchins, 1998). We leave this story outside the scope of this paper and, instead, proceed to discuss the tool's capacity.

The main function of a CAT/TM is to provide an interface where a text is parsed into segments (typically, sentences) for a translator to type in the translation of such a segment. Then, the segments are stored in a database and can be later used while translating similar texts. By replacing identical segments with available translations, CAT/TM enables faster translation. Contemporary CAT/TM systems offer a few useful features, including machine translation of segments. However, the idea remains the same: human-confirmed segments are used in multiple identical texts to save the translator's time.

The advantages of using CAT/MT are numerous (Balemans, 2020). Translators report that the tool helps them to be consistent with the terminology and ensures better quality management: the system will inform the translator when it encounters a term available in the pre-uploaded terminology roster or will check the conversion of numbers from language to language. CAT/TM also helps to plan because it shows translation progress and makes formatting easier. It will allow prompter updates to the previous translations too because it will highlight the updated segments of the text.

Better-known translation technology is machine translation (MT) familiar to most lay users. This technology developed in several stages, including rule-based MT (1950s–1990s), statistical MT (1990s–2015), and neural MT (2015–present) (Balashov, 2020). Each type of MT is different because of the underlying algorithms, and the latest stage is reported to provide the best result (Pérez-Ortiz et al., 2022). However, the MT history and principles are beyond the scope of this study. Instead, we focus on how MT affects the translation industry.

MT is a technology that delivers a compelling quality of translation when dealing with simple texts. Still, it cannot guarantee the best result with more intricate tasks (e.g., Zouhar, et al., 2021). Therefore, the technology gives rise to a human and machine collaboration, known as post-editing of machine translation (PEMT) by a human translator. This form of collaboration provides better quality on the one hand and faster translation on the other and seems to be one of the promising developments in the translation industry.

In fact, the development of machine translation and its impact on translation as a human activity is so visible that linguists and philosophers are paying increasingly more

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attention to machine translation as a human activity (Balashov, 2022). Moreover, the study of machine translation is becoming a discipline (Dorothy, 2022), whereby educators promote the ethical use of MT for teaching, learning, and translating.

3.2. Towards Augmented Translation

Despite the existing systems being imperfect, software developers hope to achieve what they describe as *augmented translation* (DePalma, 2017). Transformed from augmented reality, this term means that 'the human being is the centrepiece and has access to technologies like automated content enrichment (ACE), terminology management, translation memories, and fully automated project management, all of which, of course, need to interoperate smoothly with each other' (Jay Marciano…, 2021). Another piece of this process is a *quality estimation*, whereby an additional neural network checks the translation completed by the neural machine translation. Such a system would further reduce the translator's involvement in the finished product.

To date, some of these technologies already exist. However, they are not optimally integrated, and expert supervision remains an essential part of the process. Overall, such a vision of the translation future presupposes that translators will remain operators and be able to 'focus on what they are truly interested in: the meaning of language' (Jay Marciano…, 2021). Thus, this advancement is presented as an undeniable benefit to translators who will avoid the routine part of their jobs: the suggestion is that machines will translate so that translators do not have to translate like machines.

3.3. Technological effect on translation market

International reports suggest that the translation market is booming. The U.S. Bureau of Labour Statistics (Bureau of Labour Statistics, 2022) predicts that translation job opportunities will increase by 19% between 2018 and 2028. These projections are based on the estimations of economic growth and globalization, whereby

states and businesses will cooperate more and, hence, need translation.

Meanwhile, in this paper, we focus on the Russian market, where other factors can influence the situation. Indeed, stakeholders disagree widely in opinions about the future of the translation market in Russia. After the end of the 1990s turmoil when Russia transited from a state-supervised to a market economy, experts were unanimous about the rapid pace of the industry's development. Thus, in 2006, the expectations about the market growth were high: experts predicted the translation market to grow by 20% per year, driven by the development of the Internet and globalization (Potekhin et al., 2006). In line with these projections, Russian Translators Union Board member Bruk believed that the translation market was at the dawn of exponential growth, even though the industry was not ready for such an improvement due to the insufficient number of translators and their inadequate training (Bruk, 2003).

As time passed, projections changed under the burden of external factors. By 2019, Konstantin Dranch, founder of Translation Rating, reported that the national translation market is comparatively small (Reznichenko, 2019), and predicting its development over large spans of time is hard. Indeed, from 2013 to 2019, the industry experienced fluctuations, and its growth has not been stable. Still, just before the COVID pandemic, the translation market managed to reach a net worth of 20,88 billion roubles (Razmer i dinamika…, 2020).

The impact of COVID is harder to estimate because, apart from the pandemic effects, the Russian market remains under the pressure of geopolitical factors. Still, experts point to several consequences of the pandemic, and these outcomes are typically adverse. For one, the offline conferences transited to the online, which reduced the translators' income. Moreover, after the end of the pandemic, many such conferences remained online (Medvedeva, 2022). Second, remuneration remained unchanged for an extended period before COVID-19, and the

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global shutdown contributed to the outflow of human resources from the translation industry (ibid.). Meanwhile, Translation Rating claims that the translation industry is resilient because a significant part of it (76%) is ensured by the state, medical, legal and financial, fuel and energy, and localization segments, which remain rather stable even under the unfavourable circumstances (Razmer i dinamika…, 2020).

Digitalization effects are also noted by industry professionals as a factor affecting the future of translators. Alexey Shesterikov, Vice-President of the Russian Association of Translation Agencies, speculated that the neural machine translation is changing the workflow and renders some competencies irrelevant and outdated. Translators become operators, and they are required to know the nuances of the language and manage projects (Medvedeva, 2022). Experts also suggested that different segments of the translation market are affected in different ways. Providers of less professional and, thus, cheaper services are bound to be replaced by machines, while diligent providers of linguistic services will remain. However, in this upper segment of translation, the competition is likely to become more intense (Chto zhdet perevodchikov…, 2021). Less prominent impact of technologies on the industry is predicted by Translation Rating founder Konstantin Dranch: technological changes may occur, but they will not replace translators (Reznichenko, 2019).

Overall, global economic cooperation leads to growing demand for translation. In Russia, though, the industry is under the pressure of external factors, such as the geopolitical situation or the COVID pandemic outcomes. Technological advancement is considered a game-changing factor, too: it affects the workflow, may increase competition, and reduce job opportunities.

A limitation needs to be noted: the sources used for this overview are sometimes private opinions of experts rather than official reports. The translation market in Russia tends to lack expert agencies to provide holistic, scientifically proven reports on the industry's state of the art. Therefore, the sources may seem less credible, but delivering a more informed and credible report might be impossible.

3.4. Academic research on translator-machine interaction

The technological influence on translation industry has become a point of interest for researchers. Indeed, as Mesa-Lao (2014) suggests, translation "is going through a societal and technological change in its evolution" (p. 99).

The technological progress changes the landscape of translation by introducing new domains and altering the translator-customer relationships. One such example is the proliferation of machine translation. Since neural machine translation emerged, the machine translation quality has increased significantly and made post-editing of machine translation a routine task integrated in the CAT systems (Dorst et al., 2023: 50). The efficiency of machine translation editing has been demonstrated in several studies (Green et al., 2013; Almeida and O'Brian, 2010; Sánchez Torron, 2017). The advancement of AI-powered chatbots is also said to impact the translation industry (Lee, 2024).

However, some apprehension exists about technological changes in the industry. Fears are connected with the quality of translation, for instance. Saka E. (2020) demonstrates a translation difficulty with Google Translate's algorithmic bias, raising concerns about the use of machine translation. AI-powered translations, such as in LLMs, raising even more concern. While such translations are inferior to human translations, experts believe that in the future, some models will be trained to address translations in various fields, such as legal (Moneus and Sahari, 2024).

In total, the research on the role of translation technology is inhomogeneous and requires more investigation of the existing gap. Specifically, research is scarce in the

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Russian context, which is addressed in this study.

4. TRANSLATORS ON TECHNOLOGICAL CHANGE

The existing literature suggests that technological changes are major and inevitable. They alter the industry's landscape by automating the interlingual transfer of information. While lay sentiments concerning the translation job are often simplified (The translator, an endangered species?, 2022), professional opinions and experiences tend to be more complex and dependent on variables. This section outlines translators' attitudes to digitalization and projections on the industry's future. Thus, first, we overview the typical *technologies used* by the translators and the variables affecting the choices. Then, we discuss how *technology affects* the market regarding employment opportunities and conditions. We also report the respondents' sentiments on the *future of the industry* under technological pressure and strategies for imminent changes. Finally, we discuss how different *translators' experiences and backgrounds* affect opinions about technology.

The following report incorporates occasional references to quantitative estimations of the number of respondents. To avoid ambiguity, we would like to clarify that these numerical data are provided to inform about the most typical opinions expressed by respondents, but such numbers cannot be extrapolated on the entire population.

4.1. Technologies used

Most interviewed translators (81%) are interested in technologies, follow the updates in at least some way, and many of them use the latest advancements for professional purposes. The typical technology used includes machine translation (81%) and computer-assisted translation with embedded translation memory (74%).

Though hypothesizing that senior translators are more reluctant to use technology seems sensible, we have not identified any significant dependence between the age of the respondents and their attitudes to technology. For instance, of the four respondents aged 45+, none refused to explore and use technology for work, while two of the nine youngest were hesitant to use technology extensively. This counterintuitive result could be explained by a smaller sample size in this study or the fact that the nature of the profession requires constant learning, and appropriating a new technology, thus, might be a part of it. This said, the impression is that the more mature the translators are, the more critical they are toward technology. At least some younger translators seem to rely on technology too much, though identifying this as a tendency is impossible.

The dependence that we can identify is between the use of technology and the nature of the texts translated. We discovered that translators focusing on more creative translations are, not unexpectedly, more reluctant to use CAT tools or MTs because such tools are unlikely to help translators in their tasks. More creative texts, such as fiction literature, tend to be too complex for machines, and machines are less likely to render imagery. Additionally, the syntactic parsing typical of CAT tools is often limiting because translators may choose to render meanings across supersyntactic units (e.g., groups of sentences or paragraphs).

When such tools are justified, for example, in texts with a high number of identical sentences, CAT tools are reported to provide a faster and more accurate translation flow. Because translators can embed their translation memory (TM) within a CAT tool, translations also become more uniform. Additionally, CAT tools help to work with texts in various formats (e.g., Excel files and PowerPoint Presentations), avoiding excessive post-formatting. Sharing access with several translators also facilitates translation. Overall, translators are satisfied with the functions and interface, but some minor issues occur, such as software bugs, counterintuitive or too frequent changes in the interface entailing a period of adjustment to the novelties, and inadequate text parsing into segments.

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The applicability of machine translation for professional purposes is reported to be more limited for several reasons. First, the quality of machine translation is often substandard: texts produced by machines are typically correct grammatically but may be less accurate in choosing vocabulary. However, inappropriate syntax is probably why translators might consider MT less suitable: many machine-translated sentences have to be thoroughly rewritten for better readability and clarity. For this reason, some translators prefer to avoid machine translations in CAT tools, relying on their translation memory alone.
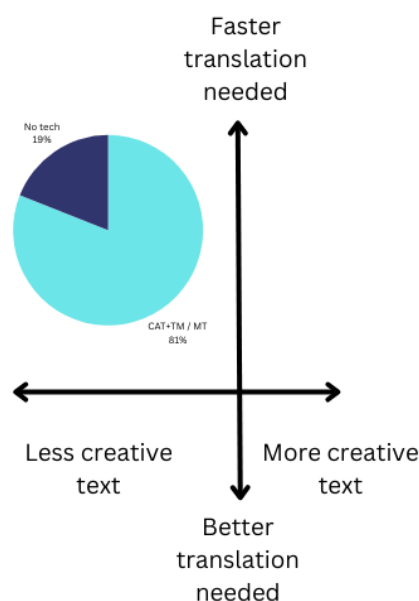
The cases when machine translation is used are not infrequent, however. One of the primary reasons why such a tool might be considered appropriate is a tight deadline when translation from scratch is not feasible. MT is also used when a customer requests post-editing a text translated by a machine. Translators also tend to use MT to translate texts written in languages they use outside work or for inspiration. Few respondents reported using MT for smaller texts. If MT is not used as embedded in a CAT tool, translators tend to prefer a neural machine translation engine as a primary solution.

The latest generative language models, such as ChatGPT or similar, are rarely used for translation. While a few translators reported that they tried the technology, only some use it for non-translation purposes, and none translating. Unlike some MT solutions that can be embedded in CAT tools, ChatGPT is a dialogue-based system, and it does not provide the convenience of a CAT tool. Thus, achieving translation uniformity with language models is so far harder.

Overall, most translators (81%) use technology for faster and less creative translation purposes, whereby CAT tools with embedded translation memory and MT are the most frequent option (see Figure 1). We are reluctant to name the specific CAT tool and MT systems employed by translators, but such systems are either industry leaders or free solutions. Most translators consider free solutions sufficient, but they (68%) also agree to pay for the software license if the software can offer a competitive edge and the return on this investment is prompt.

Figure 1. Translators (81%) Use Translation Technology For More Urgent and Less Creative Texts
Рисунок 1. Переводчики (81%) используют переводческие технологии для более срочных и менее художественных текстов

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4.2. Technological impact on the market

4.2.1. Employment, image, and communication

Since technologies permeate the translation market, their influence on it is visible. Digitalization impacts employment opportunities and translators' marketing strategies. It also entails changes in the quality standards and communication with clients and raises security issues.

Respondents (87%) tend to report that some employment changes have occurred due to the technological impact. However, translators disagree on whether such changes are positive or negative. Those (32%) who consider technological advancements as a benefit believe that technologies create new jobs (e.g., post-machine editor) and make translations (including the workflow) better, while translators become more agile and diversified in the market. The rest disagree: digitalization seems to worsen the market. Most typically, translators (32%) reported that technology stalled or decreased rates and caused some translators to seek other income sources in the adjacent areas of linguistic service provision. Some claim that rates remained the same in the past years despite rather significant inflation sustained by the economy. Additionally, respondents (23%) lamented shorter deadlines imposed on them. This change is likely to be caused primarily by the advent of the latest technologies, such as machine translation and CATs. Interestingly, several respondents noted that some professional employers, such as translation agencies, were the first to take advantage of the technological change by imposing shorter deadlines on translators and offering lower rates. Aware of the available technologies, they tend to promise faster and cheaper services to customers and, consequently, require translators to comply.

Communication with customers may be affected as well. Some translators reported that clients are sometimes inclined to request post-editing of machine translations and, thus, pay less to translators even though post-editing often requires the same or even more attention and time than regular human translation. Such kind of a mistaken belief, in turn, may affect translators' image. Because machine translation exists, the general public may think that translators' job is reduced to minor editing of machine-generated translations. Some company-employed translators reported that their superiors were reluctant to install CAT tools on company machines or provide access to MTs because otherwise, 'translators will have nothing to do.' Thus, in the company, translators tend to be less valued because everyday conversations via email or simpler texts can be converted using an MT, and this seeming easiness of language-to-language conversion makes companies question whether translators are needed. On the other hand, several translators provided examples when they managed to prove their significance to colleagues. Thus, technologies may also lead to reputational risks to the profession, according to half of the respondents (48%). In a few cases, such risks are associated with customers being unaware of the nature of the translation job and mistakenly believing that translators heavily rely on machine translation. In other cases, though, translators seem to be discontent with the attitude of the general public to the job: 'We have always been treated with some level of distrust,' as one of the most experienced respondents maintained.

Overall, the negative perspectives of respondents seem somewhat weightier than the positive ones (see Figure 2). Not only technology use leads to poorer life quality but also affects the translators' image and self-perception as professionals.

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Figure 2. Positive and Negative Changes in Employment, Image, and Communication (percentage of respondents)

Рисунок 2. Положительные и отрицательные изменения в трудоустройстве, имидже и коммуникации с заказчиками (процент респондентов)
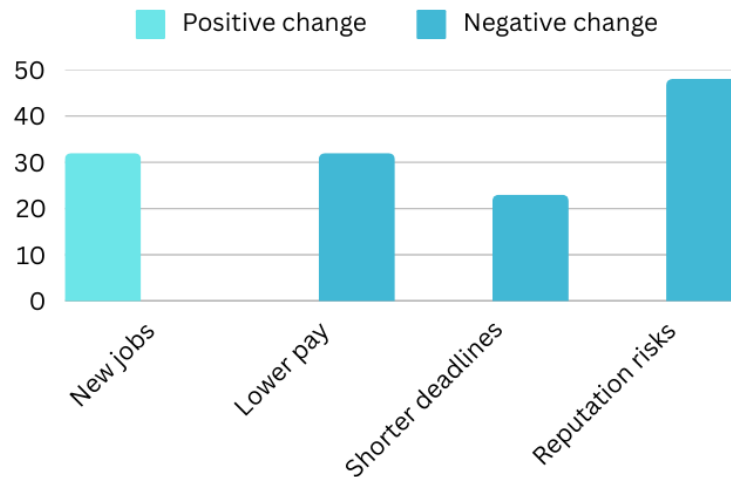
4.2.2. Quality standards and confidentiality issues

Almost a third of translators (29%) report negative changes in quality standards due to technology. Most typically, such changes are associated with pressing deadlines: translators are sometimes unable to provide the best quality in the allotted time. Additionally, customers may be willing to receive texts of lower quality at a lower cost.

However, several translators believe that the short deadlines are not the primary reason for the declined standards and maintain that standards will inevitably lower in the course of time. Specifically, one of the respondents hypothesized that the general public is becoming increasingly tolerant of machine-generated texts. They tend to consider such texts appropriate because they encounter them daily, for instance, when they read machine-generated translations in the press, which is becoming a trend (Sorgi, 2023). Therefore, such customers may be less capable of seeing the difference between their native language syntax and the syntax of machine-translated texts. This observation might be correct because several translators noticed that younger customers tend to be more satisfied with post-edited machine translations compared with older clients.

Apart from the quality standards, technologies affect privacy. Specifically, the widespread use of technology triggers security issues: free CAT tools and MTs are typically cloud-based technologies, and uploading sensitive information to such systems can jeopardize their confidentiality (Figure 3). Counter to expectations, this issue is not well taken care of. On the one hand, translators tend to be responsible users of private information: 48% (15 respondents) of respondents deal with confidential information, and to avoid leakage, they use offline media for translation or remove sensitive parts from texts before uploading them to CATs or machine translation engines. However, one translator does not seem to be bothered, believing that anything can leak anyway. Moreover, 23% of respondents never translated confidential texts, and 1% never thought about the issue, meaning that almost a quarter of industry professionals may unintentionally leak confidential data. On the other hand, translators (16%) reported a few examples whereby businesses jeopardized the security of proprietary, confidential data, and in several cases, translators assumed more responsibility for information security than the customer. Therefore, lay information users in offices may use machine translation cloud services without care and unintentionally disclose sensitive information.

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Figure 3. Confidentiality Risks when Using Translation Technologies (CD=Confidential Data, percentage of respondents)
Рисунок 3. Риски утечки конфиденциальной информации при использовании технологий перевода (CD=конфиденциальные данные, процент респондентов)
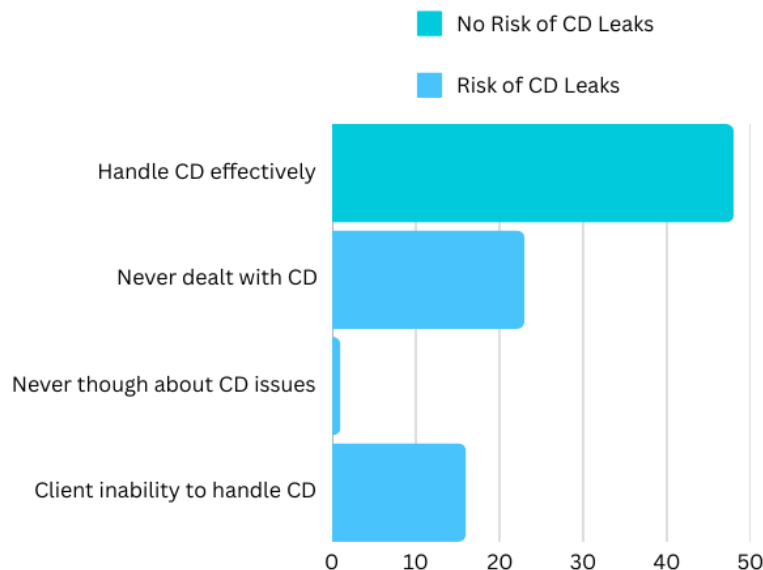
4.3. The future of translation under technological pressure

Respondents tend to hesitate trying to foresee any development of technologies because of how unpredictable such advancement can be. Some believe that nothing can happen, while others trust that the job will transform significantly and that the role of a translator will change. Overall, the opinion that technology will affect the industry's future prevails.

Most respondents (77%) conclude that the translator's profession will shrink or transform. They typically predict that translators are likely to transform into editors of machine-translated texts, a tendency visible at the moment. Moreover, further integration with technology will probably lead to higher specialization of translators and *slash* jobs, whereby translators acquire additional qualifications in related domains.

Several professionals predicted that translators would diminish in number due to the exponential improvements in machine translation algorithms. They claim that translators will be fully (13%) or partially (45%) replaced by a machine, while only 13% of respondents think this is not going to happen. In relation to this fact, half of the respondents fear technological advancement or at least feel uncomfortable that a machine can replace them.

These fears and thoughts push translators to think about remedies. Translators uniformly agree that diversifying their activities and learning new skills is indispensable for maintaining a competitive edge against machines or other stakeholders in the market. In the cases when translators have to compete against machines, they prefer to learn a new specialization (61%) or a rare language (19%), switch to post-editing of machine-translated texts (26%), provide interpretation (19%), or learn to render another linguistic and/or non-linguistic service (45%) in addition to or instead of translation (see Figure 4).

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Figure 4. Translator Responses to Potential Replacement in Job Market (percentage of respondents)
Рисунок 4. Действия переводчиков в ответ на потенциальное вытеснение с рынка переводов (процент респондентов)
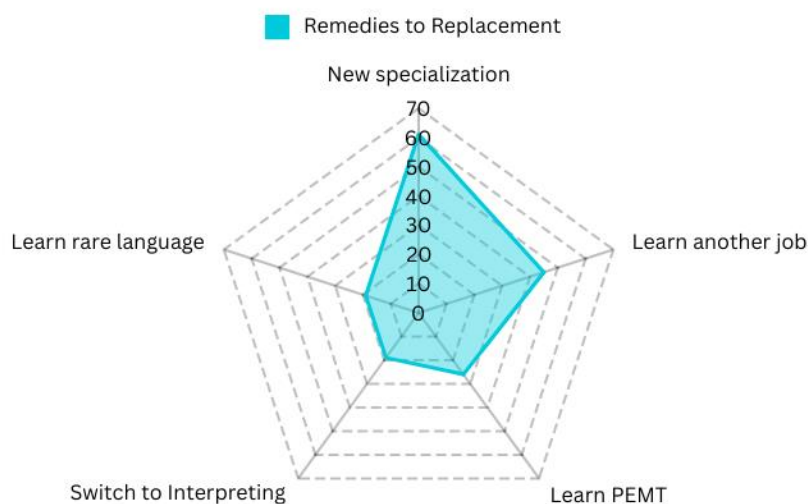
4.4. Translators' experiences and background

The respondents did not answer the interview questions uniformly. Their reactions could depend on their personal experiences and background. This section covers similarities and differences in how translators reacted to questions.

Age and place of living did not noticeably affect the answers. Those living in federal centers (Moscow and St. Petersburg) see the industry somewhat similarly to those working in the periphery. The only visible difference is that more translators in the federal centres see opportunities in technology and fear machines less than their colleagues in the periphery. This difference could be accounted for by more abundant diversification options available in larger centres compared with the smaller cities in the periphery.

Specialization and working language did not affect how translators feel about technology either. Those who translate texts on rare topics or texts poorly handled by machines (e.g., literature), as well as those bound by the Service Level Agreement (customer's quality requirements), were expected to be less apprehensive of technology. However, they, too, experience discomfort related to digitalization. In the same way, the source of income did not affect translators' opinions on technology: respondents who earn their living by translating fear or do not fear technology almost as much as those whose primary sources of income are other than translation.

Noteworthily, however, translators' vision depends on the type of employer. Freelancers tend to be more aware of the changes in the industry, while those employed by businesses and translation agencies seem to be more detached from the current trends. This conclusion is based on the fact that freelancers are more aware of the changes in communication with clients. Additionally, freelancers tend to be less protected by institutions and, thus, have to be more in line with the latest advancements. Company employees seem to feel least secure in their job. A few report that they have to prove their credibility and role in the business. Typically, this insecurity is related to the wide availability of free machine translation engines providing (seemingly) decent translations of simpler texts, such as emails.

5. DISCUSSION
5.1. Summary of outcomes

Analysing literature and interviews with industry professionals helps to conclude that

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the impact of technology on translation is evident. Digitalization permeates the translators' daily activity. The most significant technological advancement was delivered by CAT tools and MT engines. The list of tendencies, according to translators, could be summarized as follows:

• Technologies bring positive and negative changes: they translate faster but entail shorter deadlines and lower pay.

• Technologies tend to confuse clients who may believe a translator's job is to post-edit a machine's translation. Thus, technologies may worsen the image of a translator as a professional.

• Technologies can affect the quality standards in two ways: by causing shorter deadlines and by making clients more tolerant of post-edited machine texts.

• Technologies might cause security issues because some professional translators and unprofessional users of free machine translation engines could leak confidential data.

• Technologies make translators feel uncomfortable because fears exist that machines can partially or wholly replace translators.

• Technologies push translators to alter their career trajectories.

• The experience and background of respondents do not seem to impact much on their perception of technology.

Therefore, the changes brought about by the technology seem to be more numerous on the negative side rather than the positive, according to the respondents in the current study (see Figure 5).

Figure 5. Positive and Negative Implications of Translation Technology Advancement
Рисунок 5. Положительные и отрицательные последствия развития переводческих технологий
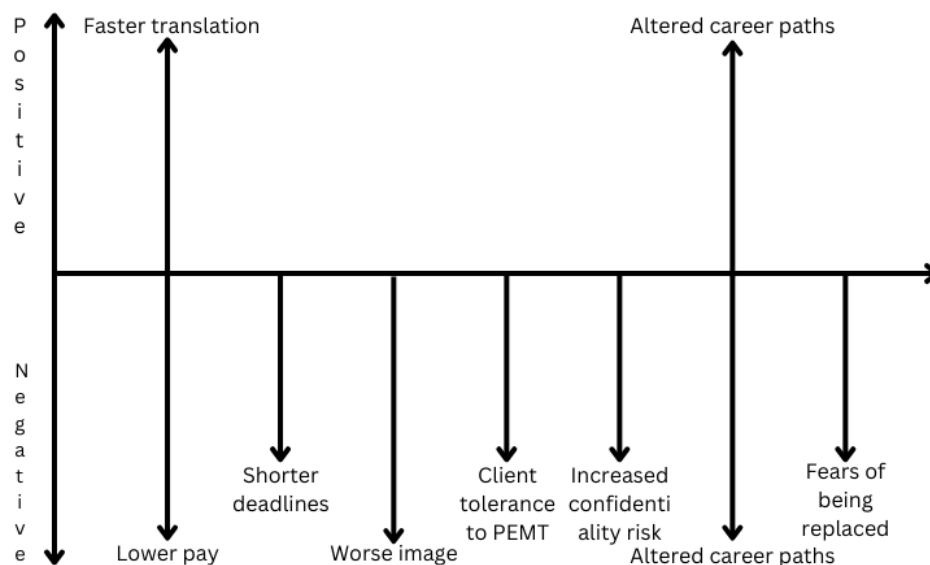
5.2. Comparison with existing research

The results achieved in the present study partially resonate with the existing research in the field of translator-machine interaction. For instance, this study confirms that the technological impact on the translation industry is visible. Cronin maintains that translators have transformed into "translational cyborgs who can no longer be envisaged apart from the technologies they engage with" (Cronin, 2003: 112), which is true according to respondents in this study – translators use some form of technology on a daily bases in their professional lives. The evidence that coincides with the outcomes

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from overseas research is not significant, though.

The most visible discrepancy between this study and international scholarship lies in the sphere of machine translation and its post-editing. Thus, the context explored in this study seems to lack much emphasis on the role of machine translation post-editing. The respondents are reluctant to embrace the new reality of clients requiring post-editing rather than translation. The reasons include the complexity of post-editing needing sometimes more work than translation from scratch but resulting in lower pay. Translators also tend to fear that post-editing will adversely affect translators' reputation. At the same time, European Language Industry Survey 2021 (EUATC 2021) of 172 language service providers and 575 independent language professionals suggests that machine translation and post-editing are already industry standards. Similar corporate research attests to the same. Thus, RWS Technology Insights (2020) reported that 40% of translators use machine translation, and 64% believe that it increases efficiency. In the same year, Memsource (2020) revealed that machine translation users are twice more productive. In 2022, the same company found that more than 50% of localization projects are accomplished using machine translation. Academic research confirms industrial conclusions about machine translation productivity (Green et al., 2013; Almeida and O'Brian 2010; Sánchez Torron, 2017; Gaspari et al., 2014; Gaspari et al., 2015; Guerberof Arenas, 2014).

The reason why respondents in this study are sceptical about machine translation and post-editing, unlike their international colleagues, might be that most respondents in this study are freelance translators, with only a few of them cooperating with translation agencies. This suggestion is in line with the European Language Industry Survey 2021 (EUATC, 2021) results: freelancers are typically more reluctant to embrace machine translation post-editing. Scholarly research confirms this reluctance. For instance, Läubli

and Orrego-Carmona (2017) analysed how translators evaluate machine translation of social media posts, and machine translation was assessed more negatively than human translation. On top of it, Pielmeier and Lommel (2021) reported that only 37% of freelancers thought highly of machine translation products.

Another explanation why respondents in this study were hesitant to use machine translation could be the fact that most of them (23 of 31) are experienced translators whose opinion about the quality of machine translation is mostly negative. This suggestion agrees with scholarly research comparing the perception of machine translators by more and less experienced translators: the former were mostly negative about the quality of machine translation, while student translators believed that machine improves their productivity (Green et al., 2013; O'Curran, 2014; Guerberof Arenas, 2014; Koskinen and Roukonen, 2017).

Another discrepancy between this and previous research concerns the use of AI-powered chatbots for translation. Translators in this study do not believe Large language models (LLMs), such as ChatGPT, to be instrumental. However, the existing literature considers such tools for translation and confirms that LLMs can even outperform translation services, such as Google Translate or DeepL (Lee, 2024). The reason for such a discrepancy could hide in the fact that professional translators find LLMs inconvenient because these models are not integrated in the CAT tools that parse the text into segments ready for translation. This inconvenience of using LLMs seems to outweigh the possible advantages of chatbot translations.

Overall, the international research outcomes in this field offers controversial results heavily dependent on who researchers ask and where. Yet, the results in this study seem to be more pessimistic concerning the prospects of integrating machines in translation comparing to international views. For instance, respondents to this interview

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raise certain degree of concern about the job losses. Similar concerns are raised in other studies across the world, but the opposite viewpoint is also evident. For instance, in Bulgaria, Kirov and Malamin (2022) did not find any evidence that the quality of translation may decline due to automation or that translators fear losing jobs or being replaced.

As a result, the discrepancy between these results and the existing research is rather significant and could be explained by several reasons. First, the Russian market seems to differ from the global contexts where previous research was undertaken, this difference being often objective. Second, the sample for this study was not sufficiently diverse to cover all the issues considered by international scholars. For instance, only very few respondents in this paper are familiar with the translation project management in translation agencies. Thus, this technology remained largely uncovered.

5.3. Implications for industry and beyond

The revealed tendencies bear implications for the industry and beyond. Some of them require action in the immediate future from individual translators and institutions. Omitting to act upon them entails socially significant hazards.

5.3.1. Implications for professional translators

Translators might need to consider investing extra effort to acquire new skills, such as interpretation, enter a new specialization, or learn to provide another linguistic service. This necessity does not result from an imminent threat to translators' jobs, so professionals may have more time to prepare for future changes to stay diversified.

5.3.2. Implications for translator training

The need for specialization creates a predicament for young professionals. Students seldom learn to specialize in a particular area in their years of studies. They, therefore, graduate being able to translate less sophisticated texts requiring no specific knowledge. Such texts, coincidentally, are relatively well-translated by machines. Thus, the need for younger professionals may diminish. This can entail a gap between what fresh-out-of-school students can do and what the industry wants, this gap being largely covered by a machine. Additionally, respondents noted that *office* texts, such as emails, are well-translated by machines. Therefore, training translators for office work seems less necessary.

5.3.3. Implications for translation agencies

Professional employers might be aggravating the effects of the advancing technology: the short-term benefit accrued by the agencies can backfire. Specifically, translation agencies tend to set increasingly short deadlines, agree to post-editing of machine translations, and tend to keep translator rates lower. Such tactics may bring a short-term competitive edge. However, they seem unwise strategically: the time needed for translation cannot be short in all circumstances, but customers may become used to prompt translations. Besides, shorter deadlines exert pressure on translators. As one of the respondents complained, the space for creative and quality work is shrinking: 'Once in a while, you want a coffee and a conversation with your colleagues, discuss a difficult case and be able to seek advice and think.'

5.3.4. Implications for businesses

The widespread use of free machine translation engines creates a danger of sensitive information leakage. Regular office workers may refer to cloud-based machine translation sources using simple smartphone applications and share sensitive information. This scenario seems possible because our respondents reported a few cases when unprotected technologies were used to transfer information.

Besides, in the office, employees might avoid referring to a translator to check the outcomes of machine translation. Since such translations may contain inaccuracies, relying on the technology alone may cause

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reputational or financial losses and even endanger human life.

5.3.5. Implications for the society

Machine-generated translations are different from those created by humans: the former may contain semantic inaccuracies and even distort meanings, and they are syntactically simple to the degree of sounding unnatural. However, the increasing use of such texts can lead to tolerance of them. In the long run, the widespread reliance on such texts may affect the quality of communication leading to the simplification of texts and disrupted known-new contract (Jiang and Niu, 2022), a primary vehicle of text cohesion. Machine translation, coupled with AI-generated texts in language models, such as ChatGPT, may seriously affect social relationships (Hohenstein et al., 2023).

5.4. Limitations

We believe that this study offers an exciting overview of the existing literature on translation technology and discusses translators' opinions on its impact. Interestingly, these sentiments reflect on aspects that impact society in general and offer implications for the industry. Meanwhile, the value of this research is reduced by several limitations.

The first limitation concerns our reliance on academic as well as grey literature. In some instances, procuring credible literature was hard, and the only available sources were those we could trust with reservation. Such grey literature included statistics produced by organizations with probable risk of bias and private expert opinions, whose standings could be affected by their institutional or business affiliation.

Second, translators do not exist outside society, and whichever pressure is exerted on society, translators experience it. Thus, the opinions presented here could be partially affected by political or economic factors, even though interviewers tried to eliminate the discussion of irrelevant factors. The nature of the interview is that it relies on the private opinions of individuals, and opinions tend to be shaped by the emotional background

founded on a host of factors. Therefore, we cannot guarantee that the opinions presented here are unbiased.

Finally, we invested significant effort to hand-pick a representative sample of translators. Still, 31 professionals could not cover the diversity of the existing opinions and circumstances. Thus, the limited number of respondents constrains the extrapolation of the results. Moreover, most respondents live and work in the Russian Federation, and expanding the results to other parts of the world may be problematic.

5.5. Future Work

Technologies develop promptly. Consequently, the results achieved in this study can become less relevant in time. Besides, predicting if and how technology will change the translation profession is difficult because the technology advancement forecast is questionable. On the one hand, technologies will continue to improve. On the other hand, training models will become hard due to the increasing number of texts produced by machines and circulating on the web. Machines cannot learn from such texts (Sarker, 2021). Developing translation tools is difficult, too: the business of providing automated translation tools is not as profitable, which may become a limiting factor of technological development in this domain (Zetzsche, 2022).

These factors and the limitations of this study require continued efforts to monitor the impact of technologies on the translation industry. Additionally, similar studies could be arranged in other countries to compare the perception of machines' impact on the industry elsewhere. Such efforts could provide a valuable understanding of the state of the art of the industry and the dangers professional translators may encounter.

6. CONCLUSION

The translation industry is moving toward the idea of augmented translation. While translators seem to handle the idea of technological advancement relatively effectively, the innovation, nevertheless, brings several challenges registered in the

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implications above. Therefore, the idea of augmented translation promoted by some organizations and researchers may lead to unpredictable results within and beyond the translation profession.

Thus, many factors need to be considered before implementing translation technologies. A disrupted translated market unprepared for innovation may lead to adverse economic effects since translation is a linguistic service thoroughly integrated in almost every sphere of the economy, including those critical for human lives, such as medicine.

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