A review of computer-assisted translation (CAT) tools used by Croatian translators

Borucinsky, Mirjana; Kegalj, Jana; Vukalović, Nino

Sveučilište u Rijeci, Pomorski fakultet
University of Rijeka, Faculty of Maritime Studies

UNIRI DIGITALNA KNJIŽNICA

dabar
DIGITALNI AKADEMSKI ARHIVI I REPOZITORIJI

A REVIEW OF COMPUTER-ASSISTED TRANSLATION (CAT) TOOLS USED BY CROATIAN TRANSLATORS

Mirjana Borucinsky, University of Rijeka, Faculty of Maritime Studies
Jana Kegalj, University of Rijeka, Faculty of Maritime Studies
Nino Vukalović, University of Rijeka, Faculty of Humanities and Social Sciences

Abstract

Nowadays, as the demand for fast and accurate translations is growing, translators increasingly rely on computer technology to facilitate the translation process. In this sense, computer-assisted translation (CAT) tools and machine translation (MT) tools have become a necessity in daily work. This study attempts to shed light on the use of CAT tools, particularly among Croatian translators, regarding the types of tools used, the extent to which they are used and the extent to which they facilitate and/or expedite the translation process. The results are discussed in the context of a previously conducted survey among translators around the world on the same topic. The sample for the survey included 94 translators registered in Croatia with different experience and language pairs. The results show that a large number of translators use CAT tools but they do not agree on the degree of their efficiency.

Keywords: computer-assisted translation, machine translation, Croatian translators

1. Introduction

Today we can justifiably claim that translation has entered a new era in which the human translator works "hand-in-hand" with the computer, which has become an essential and inevitable part of the translation process[1]. The translation process is

---

[1] This paper is based on the results of a questionnaire conducted by the third author in partial fulfilment of the requirements for his MA degree (cf. Vukalović 2021).

considered to be a continuum ranging from machine translation (MT), i.e., translation primarily performed by a computer on the one side, to human translation on the other, with computer-assisted translation (CAT), i.e., translation primarily performed by a human with the assistance of a computer, being in between the two (Bowker and Fisher 2010, 60). Yet another distinction is made on this continuum identifying human-aided machine translation (HAMT) and machine-aided human translation (MAHT) that represent different stages on the continuum (Karpińska 2017, 134), while Quah (2006) adds another term of fully automatic high-quality (machine) translation (FAHQT/FAHQMT) in line with contemporary advances in the field. There are also those researchers who consider the distinction between human and machine translation to be vague and blurred (cf. Castilho et al. 2018, 28).

The advances in CAT and MT are mainly due to the development of computational linguistics and computer science from the 1950s to the present. In the initial stage, the first attempts at developing automatic translation were very limited in scope, but they paved the way for other research and development projects. This stage was followed by a period of frustration and disappointment, as the first translation programmes showed to be slow, inefficient and expensive (cf. Craciunescu, Gerding-Salas and Stringer-O'Keeffe 2004, 3; Quah 2006, 60). Thus, in 1966, the ALPAC (Automatic Language Processing Advisory Committee) Report concluded that the research had failed to produce satisfactory results. Fortunately, research continued, yielding important developments in the 1980s and 1990s following the revolution in computer technology and developments in linguistics, in particular computational linguistics and corpus linguistics. In the 2000s, the wide availability of computers and discoveries in information technology, the rapid development in natural language processing, especially the development of neural networks, led to further advances in software for translation purposes, which became less expensive and more accurate. This led to a proliferation of various automatic translation programmes, both CAT and MT, and today even MT integrated in CAT. The integration of the two tools has the advantage of offering the best of both with the human translator still involved in the final stage of the process.

Various studies have been conducted on the use of CAT and MT tools in translation, their efficiency, their impact on the translation process and the translator or the possibilities of their use in translator training, but not many such studies have been conducted in Croatia. This study attempts to investigate the use of CAT tools among Croatian translators and to analyse their experiences with CAT tools.

2. Main features of CAT tools

CAT tools began as stand-alone software that could be used as a desktop application on only one computer, but their features evolved as IT advanced, first to server-based tools in the late 1990s, collaboration platforms in the 2000s and today they can be cloud-based and accessed from anywhere in the world (Esselink 2019, 110). CAT tools rely primarily on the human translator to provide an input based on which future automatic translations may be generated. They have developed rapidly in recent decades, and they are more accessible and affordable (cf. Esselink 2000; Lagoudaki 2006; Craciunescu, Gerding-Salas and Stringer-O'Keeffe 2004). CAT and MT represent different approaches used in translation (Craciunescu, Gerding-Salas and Stringer-O'Keeffe 2004). While the translator performs the translation with some assistance by a computer in CAT, in MT the entire work is done primarily by a computer, with human intervention during the pre- or post-editing process (Bowker and Fisher 2010, 60). Both CAT and MT aim to deliver the message from one language into another, but they are based on different principles, or a different "primary agent" (Kenny 2020, 305) who provides the translation. The main advantage of both is less time spent for translation and larger amounts of text translated. As in any other field, new technologies have changed the translation process, which can be illustrated as in Figure 1, where the source text is first pre-processed by MT or CAT, or even CAT enhanced with MT resulting in an intermediate product of translation which is then edited by a human translator who yields the target text as the final output.
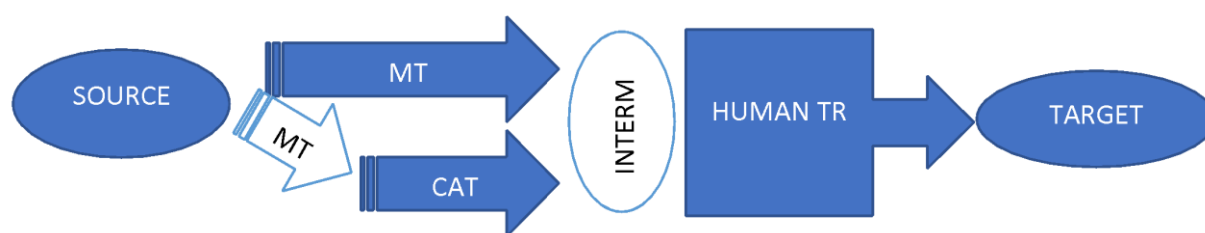
Figure 1.   Process of translation with CAT and MT (source: authors)

CAT software uses different computer resources to create a working environment for the translator. The most salient features of CAT are translation memories (TMs) and the terminology management system, which work in synergy and contribute to efficiency and terminological consistency of a translation. On the one hand, the various components of terminology management system and TM are limited by the past work of the translator as they store terms and texts which the translator has previously dealt with, but on the other hand, they may provide more accurate translations of certain terms and phrases as they have been translated, edited and (ideally) proof-read by the human translator.

TMs, according to Bowker and Fisher (2010), are parallel texts that are usually aligned at sentence level, and when a new translation is created, the TM searches for similar segments in the database so that they can be reused. In case a match is found, the TM displays it to the translator, indicating the exact percentage of the match, so that the translator can then decide whether to accept, modify or reject the proposed translation. Translation memory systems also have built-in concordancing tools that enable various searches of specific words, character strings, wildcards, structural patterns, etc. TMs are built by translators themselves, individually or in cooperation, either by interactive translation or post-translation alignment (Bowker 2002, 108). They can be supplemented by external tools, such as grammar and spelling checkers or other linguistic quality checkers.

A term base (TB), i.e., terminological database is a database of specific words, that serves as a repository of terminological information that can be retrieved by looking for exact matches, fuzzy matches or truncated searches (Bowker 2002). A TB can be built by the translator from the beginning, uploaded to the software from an external source or merged with other term bases or even term banks. TBs may be complemented with images or other materials, thus facilitating the management of terminology (Quah 2006, 105). Another feature related to the TB is the

possibility of creating a concept system, or a thesaurus, which gives an insight into the conceptual structure of a domain (Cabré 2010, 361). The TB may also be used for term extraction which identifies multi-word units and may be monolingual, bilingual or multilingual (Kageura and Marshman 2019, 62). Bowker (2002, 81) also points to the possibility of active terminology recognition (ATR), i.e., automatic dictionary look-up that automatically finds terms in the database and displays them to the translator. It ensures consistent use of terminology, thus saving time, improving translation quality and cutting costs. Kageura and Marshman (2019) emphasise the need for continuous and regular updating, maintenance and housekeeping of TB data in line with revisers' corrections, clients' requests for changes or evolution of the software used.

Both the TB and TM are updated by the translator via the editor, or workplace in the CAT tool. Contemporary CAT tools may also include external TB and MT tools, but one of the major benefits is their ability to share TBs and translation tasks with partners in the process of the so-called collaborative translation (Neather 2020, 70).

2.1 Advantages and shortcomings of CAT tools

Computer technology in general serves to streamline and expedite processes, which also applies to translation. Both CAT and MT have accelerated the process of translation and have contributed to translator efficiency by increasing the volume of translated text. It is not just that CAT tools boost efficiency, but as King (2019) emphasises, they yield consistency of translation work, reduce the effort of translating the same or similar sentences, allowing the translator to spend less time on the mechanical part of translating and devote more time to intellectual processing and quality assurance.

Another important advantage of CAT tools is the possibility to reuse the already translated phrases, sentences or even paragraphs stored in a TM and to share them with other translators. Owing to this, it is nowadays very frequent that clients themselves insist on the usage of a certain CAT tool through which they share their own TMs and TBs, thus ensuring terminological consistency and accuracy. Chan (2017, 30) highlights seven features of CAT tools that contribute to their efficiency, namely, simulativity (referring to CAT simulating human behaviour when it comes

to e.g., switching between text types), emulativity (e.g., allowing for the conversion of currencies or measures), productivity (i.e., recycling previous translations contributes to the overall productivity), compatibility (across different operating systems, supported languages, etc.), customizability (i.e., adapting the translation to specific needs, e.g., localization or lexicographical customization), collaborativity (i.e., contact between parties, sharing resources) and controllability (i.e., controlling the input text to get the desired output). The latter requires some form of pre-editing and might be considered as a shortcoming as it requires extra time by the translator.

On the downside, new tools require time and effort to master, including a fair mastery of IT skills. Another disadvantage is that TMs are useful when translating in the same domain, but in case of a new topic, a new TM has to be built from scratch. Building TMs and TBs is a time-consuming process and requires continuous engagement by the translator. Furthermore, different clients may require the use of different CAT tools which may not be mutually compatible. Mellinger and Shreve (2016, 132) also found that TM complicates the process of translation in a way that it forces the translator to reconsider, edit and make decisions about the suggested translation, which might lead to over-editing, under-editing or no editing at all. Furthermore, Cadwell et al. (2016) highlighted some negative impacts of CAT tools such as inefficiency and user irritation because of the complexity, conception or design of CAT tools. Similarly, King (2019) listed several limitations of CAT tools because of which they cannot be fully implemented in everyday work. One of the limitations is caused by the effect of segmentation, usually on the sentence level, which disrupts the flow of translation and loses context. There is also the problem of replication of errors which enter the TM and then get recycled, therefore TMs have to be checked and maintained which is both time-consuming and labour-intensive. Moreover, CAT tools require the material to be in a digital format and they are also subject to technical issues, such as bugs or downtime. Finally, CAT tools require a set of new skills on the part of the translator, particularly digital and technical skills, as emphasized by King (2019). This has an impact on the recruitment and training of translators, as well as on job stress and work satisfaction. The author further notes that the translation has to be completely revised at a certain point, particularly in high-quality publications or high-risk content, such as medical or legal texts.

All of this indicated that a translator has to be familiar with CAT tools and use them, being at the same time aware of all of their advantages and limitations.

2.2 Studies of the use of CAT tools

In 2013 Proz.com, the largest web portal for translators with 1 million registered users and 4.5 million unique visitors per month, conducted a survey to find out to which extent translators use CAT tools, and to assess their attitudes towards CAT tools (Tabor 2013). The survey was conducted on a sample of over 3,000 translators worldwide, and primarily targeted full-time professional translators who had been working in the translation industry for at least five years; the largest group of respondents was between 25 and 35 years old (Tabor 2013). 88% of respondents of the survey reported using at least one CAT tool for at least some of their translation tasks. Among those who use CAT tools, 76% use more than one tool, and the main domains for which they use CAT tools are: 1. Technical/Engineering 34% 2. Business/Financial 15% 3. Marketing 12% 4. Medical 12% 5. Law/Patents 11% 6. Art/Literary 5% 7. Social Sciences 4% 8. Science 4% 9. Other 3%. Out of the 12% of respondents who do not use CAT tools 68% had used or tried to use a CAT tool before, and 32% had never used a CAT tool, and only 3.4% of the respondents did not know what a CAT tool is. According to this survey, as shown in Figure 2, Trados Studio[2] was the most dominant CAT tool on the market, followed by Wordfast and memoQ.

The overall percentage of translators who reported using CAT tools is fairly high (88%), which might be due to the fact that the survey encompassed a large number of translators employed in a translation agency, who use CAT tools more frequently than freelance translators. Nevertheless, CAT tools are without any doubt widely used by translators. In another survey from 2003 conducted by the German BDÜ (Bundesverband der Dolmetscher und Übersetzer) and the British ITI (Institute of Translation and Interpreting) concerning the use of TM, only 29% of the respondents reported that they used TM daily, 15% weekly and 36% reported not using a TM at all (Wheatley 2003). This clearly indicates a pronounced change in the use of CAT tools in the period.

---

[2] SDL was acquired by RWS in 2020, and the tool, formerly known as SDL Trados Studio, is now known as RWS Trados Studio.
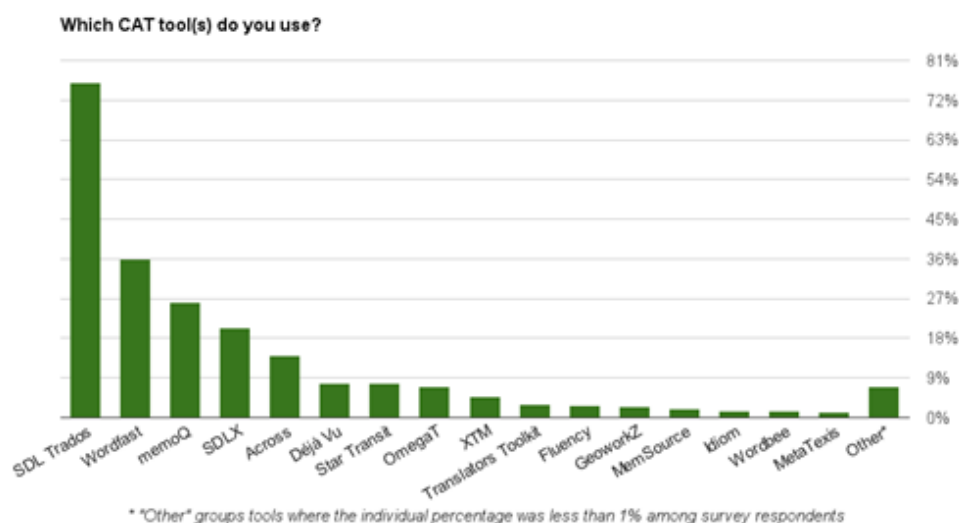
Figure 2.   CAT tool usage (Tabor 2013)

A more recent study conducted by The European Language Industry Association (ELIA), encompassing 1,200 respondents across 55 countries, reported that more than 50% of companies and individual language professionals used MT in 2018 (ELIA 2018 cited in O'Hagan 2019: 1). According to Steurs, van der Lek-Ciudin and Vanallemeersch (2016) TM is one of the "most heavily used features" of CAT tools, and TB one of the least used features. This is not surprising as building a TB is a time-consuming task, requires extensive maintenance and has no short-term and direct and billable result (Steurs, van der Lek-Ciudin and Vanallemeersch 2016). In January 2022 The European Language Industry Survey (ELIS 2022) received 1,342 responses from language service providers, independent language professionals, students and representatives of training institutions and language departments and language service buyers, in which slightly more than 70% of translators reported using MT for their work, "albeit half of them only on occasion". The results of the survey also indicate that 35% of independent language professionals see improved MT quality as an opportunity, whereas 41% see it as a threat.

3. Research context and research questions

This study investigates the use of CAT tools, particularly among Croatian translators, regarding the types of tools used, the extent to which they are used and the extent to which they facilitate and/or expedite the translation process. This study is significant as only a few similar studies (as noted by Omazić and Pavlović

2022) have been conducted for the Croatian language, albeit with a greater focus on MT than CAT. The results of some studies have been reported at conferences (cf. Rajh, Koričan Lajtman and Omazić 2021), and are awaiting publication. The results of this study are discussed in comparison with previously conducted surveys (ELIA 2018; Tabor 2013) among translators around the world on the same topic.

The study presented here was guided by the following research questions:

1. To what extent are CAT tools used by translators in Croatia?
2. Which CAT tool(s) is/are used most commonly by translators in Croatia?
3. Does the use of CAT tools increase efficiency when translating?
4. What are the reasons for not using CAT tools?

4. Methodology

4.1 Participants

In 2018, there were 1466 translators and 418 translation agencies registered in Croatia (Hlavac and Veselica Majhut 2019, 9). In this study, 94 translators responded to the online questionnaire on their attitude towards and use of CAT tools. In the sample, 31.33% respondents were aged between 25 and 34, 27.7% between 45 and 54, 26.6% between 35 and 44, 11.7% were aged 55 or above, while 1 (1.1%) participant was younger than 25. Three respondents did not wish to state their age. The sample comprised 81.9% (N=77) female, and 18.1% (N=17) male respondents, who work either as freelance translators (N=78, 83%), or as in-house translators (N=16.17%). Furthermore, 70.2% (N=66) of the respondents work as full-time translators, and 29.8% (N=28) work as part-time translators.

As to their experience in translation, most participants (N=41, 43.6%) reported having between 5 and 15 years of experience, 26.6% (N=25) between 16 and 25 years of experience, 16% (N=15) less than 5 years, and 13.8% (N=13) reported having more than 25 years of experience in translating.

The most represented working languages were English and Croatian, as reported by 78.7% of the respondents. The respondents were given the option to choose more than one combination here. Other language combinations included Croatian and German (31.9%), Croatian and Italian (20.02%), Croatian and French

(13.8%), and Croatian and Spanish (7.4%), Bulgarian, Chinese, Czech, Hungarian, Polish, Russian, Serbian and Slovenian (1.1% for each combination).

4.2 Instrument

An online questionnaire administered via Google Forms in the spring of 2021 was used to collect the data (see Appendix). The first section of the questionnaire was used to collect demographic and contextual data, such as participants' age, sex, years of translation experience, employment (freelance or in-house translators, full-time or part-time), language combinations, and types of texts they translate. Based on the answer they provided to the question whether they used CAT tools, they were directed to complete either the second or the third part of the questionnaire. The second part of the questionnaire was for those translators who do use CAT tools. Among other things, it was designed to find out how long the translators have been using a CAT tool or various CAT tools, which tools they use in particular, whether they are required to use CAT tools by their clients, and finally, if they believe that CAT tools boost their efficiency in the translation process. The third section of the questionnaire was tailored to those translators who do not use CAT tools, with the purpose of finding out the reasons for not using CAT tools.

The final part of the questionnaire included an optional open-ended question, allowing the participants to leave any additional comments regarding their experience with CAT tools.

5. Results and discussion

Similar to the results of the study conducted by Tabor (2013), and ELIA (2018), the majority of the respondents (86.2%) reported using CAT tools in their translation tasks, as opposed to 13.8% who did not use any CAT tools at all.

Of those who use CAT tools, only a minor percentage (9.9%) have been using them for more than 15 years, whereas 32.1% have been using CAT tools for 7-15 years, 30.9% for 3-7 years, 18.5% for 1-3 years, and 8.6% reported that they have been using CAT tools for less than a year.

Those who use CAT tools, mostly (69%) work for both foreign and domestic clients, as shown in Figure 3, but the relation between the type of clients and the use of CAT tools has not been analysed further in the study.
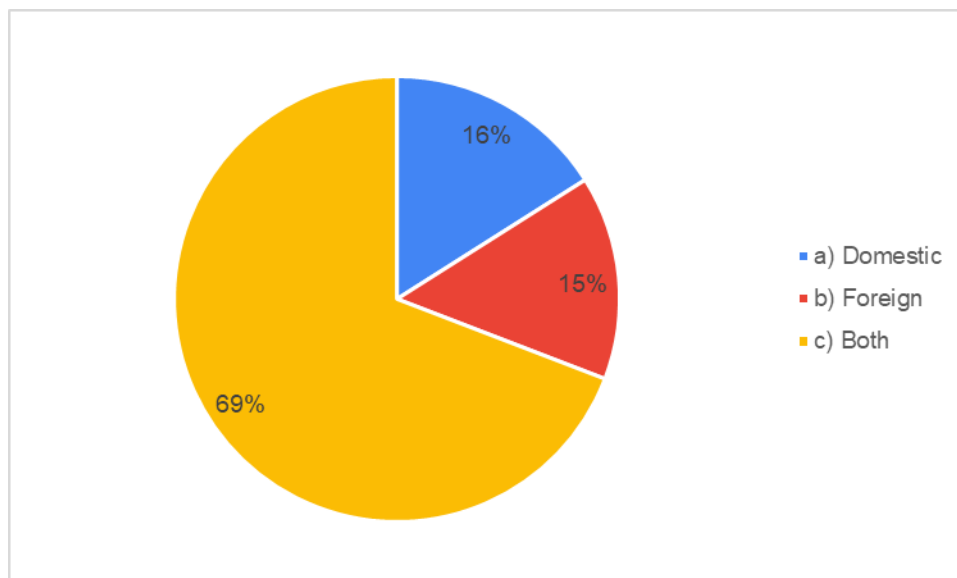

Figure 3.   **Respondents' answers to the question: Are your clients domestic (Croatian) or foreign?**

Furthermore, 60.5% of translators use more than one CAT tool. In addition, 56.8% of those respondents who use CAT tools reported that their clients require them to do so. One respondent stated that CAT tools are widely used abroad, and added that it is extremely rare to have a foreign client who does not require translators to use CAT tools. Clients often insist that translators use their TM, which might lead to discontent among translators as they do not always agree with the terminology upon which the client insists (Smiljanić, personal communication, 2022).

Regardless of the use of CAT tools, most respondents translate the same type of texts, with legal texts being most frequently translated. The main difference between CAT tool users vs. non-users relates to the translation of technical texts such as user guides and manuals, where most CAT users (76.5%) translate them, and only 1 non-CAT user does (see Figures 4 and 5).
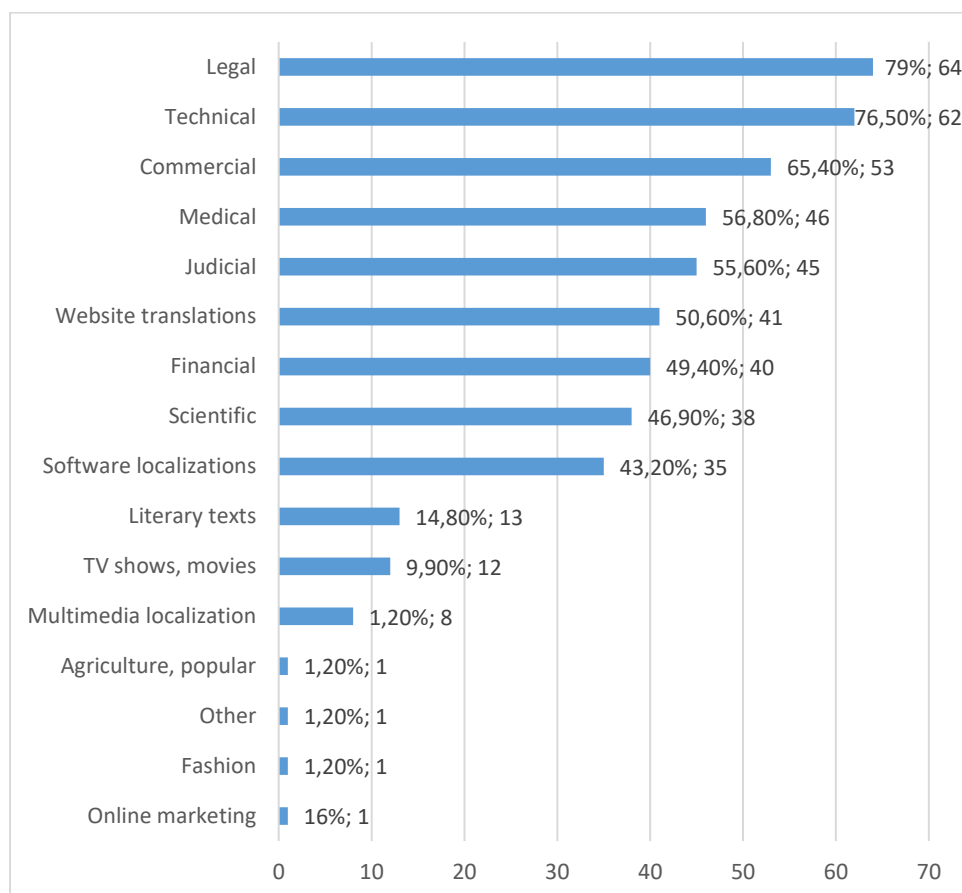
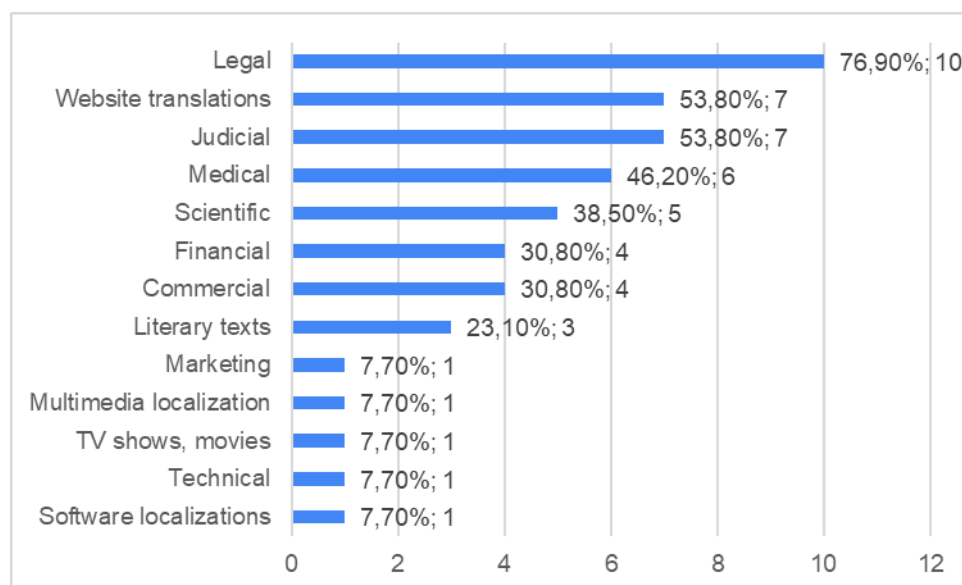**Figure 4.** **Texts and text types translated by respondents who use CAT tools**

Figure 5. **Texts and text types translated by respondents who do not use CAT tools**

The results further show that, among translators in Croatia, Trados Studio is the most widely used CAT tool, as 82.7% respondents reported that they use it mostly

(Figure 6). The next most used tool is reported to be Memsource (46.9%). Third in terms of usage was memoQ, with a reported us of 37%. Wordfast seems to be less popular in Croatia, when compared to the global survey carried out by Tabor in 2013, with a market share of 22.2%. The other CAT tools that respondents reported using are listed in alphabetical order: Across Language Server, Omega, Smartcat, Transit NXT, Wordbee and XTM. One respondent chose Google Translate as the CAT tool which they use, although Google Translate is a machine translation tool, not a computer-assisted translation tool.
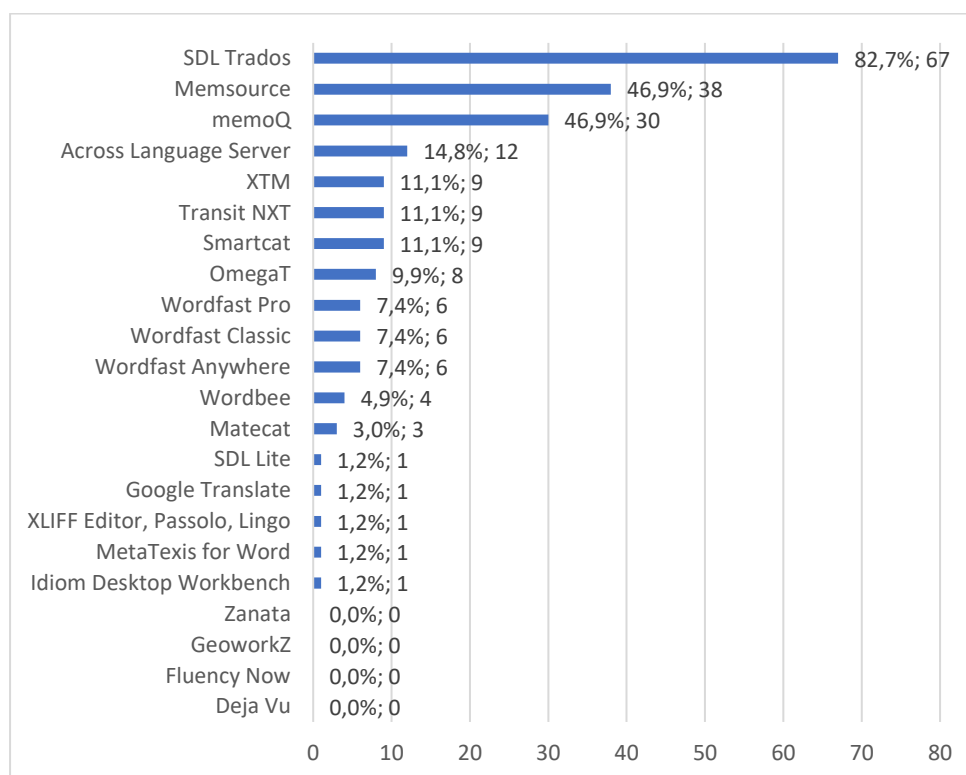

Figure 6. **Respondents' answers to the question:** *Which CAT tool(s) do you use?*

Almost half of the respondents, i.e., 48.1%, report that Trados Studio is their favourite CAT tool, followed by Memsource chosen by 11.1% of the respondents, and memoQ chosen by 5.3% of the respondents (Figure 7).

It seems that the respondents favour tools that they mostly use (compare Figures 6 and 7): Trados Studio appears high on both lists, whereas Memsource and Wordfast Classic are low on both.
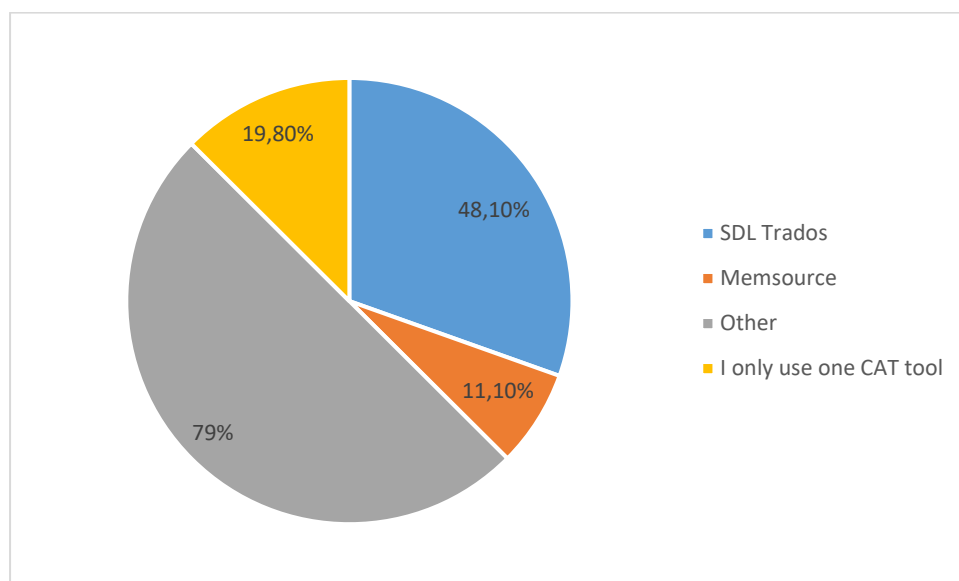
Figure 7.   Respondents' answers to the question: *Which is your favourite CAT tool?*

While estimating the use of CAT tools and enhanced efficiency in the translation process, 95.1% of the respondents believe that they translate more efficiently when using CAT tools, while only 4.9% did not share this belief. The translators' subjective estimation of the degree of efficiency with CAT tools showed diverse responses (Figure 8), as 5.3% believed to be 10-20% more efficient, 23.7% of the respondents reported being 20-30% more efficient when translating with a CAT tool, which is not a considerable difference, but is nonetheless indicative. Others believed to be 30-40% more efficient (13.2%), 40-50% more efficient (19.7%), 50-60% more efficient (9.2%), 60-70% more efficient (6.6%), 70-80% more efficient (9.2%), and 90-100% more efficient (2.6%), while 10.5% of the respondents were not sure, i.e., could not define the exact increase in efficiency. However, none of the respondents estimated the efficiency increase of 80-90% when using CAT tools. Excluding the "unsure" answers, most translators estimated that CAT tools increase their efficiency in the translation process roughly between 20% and 50%. Although this might be considered significant, it is nevertheless a subjective assessment only and further investigation into this topic is required, e.g., through more objective measurements such as word-per-hour tests, etc.
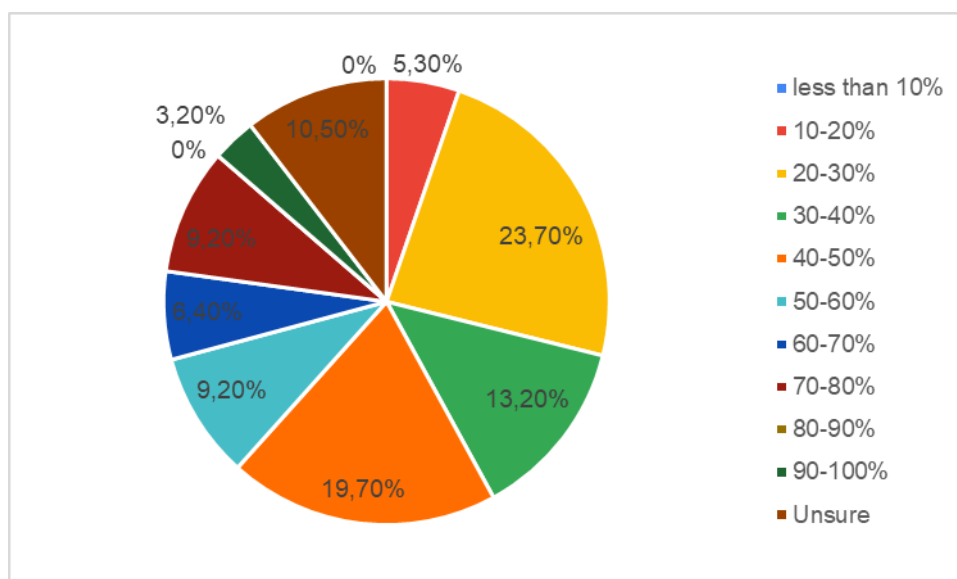
Figure 8.   **Respondents' answers to the question: By your estimation, how much is your efficiency increased when translating using a CAT tool?**

Concerning the most important features that a CAT tool has, 29.6% of the respondents ranked speed to be of primary importance (Figure 9), which is understandable, given that translators are expected to translate texts quickly, and how fast a translation can be done is sometimes the key factor. The next factor the respondents deem important is the wide array of features (23.5%), followed by ease of use (21%), and compatibility (16%). Other relevant features are reported to be customization (4.9%), tech support (1.2%), price (1.2%) and two features reported by the respondents, TMs and quality assurance and control, both at 1.2%. Curiously, the price of a CAT tool did not seem to be of primary importance for professional translators, provided the other features are present.
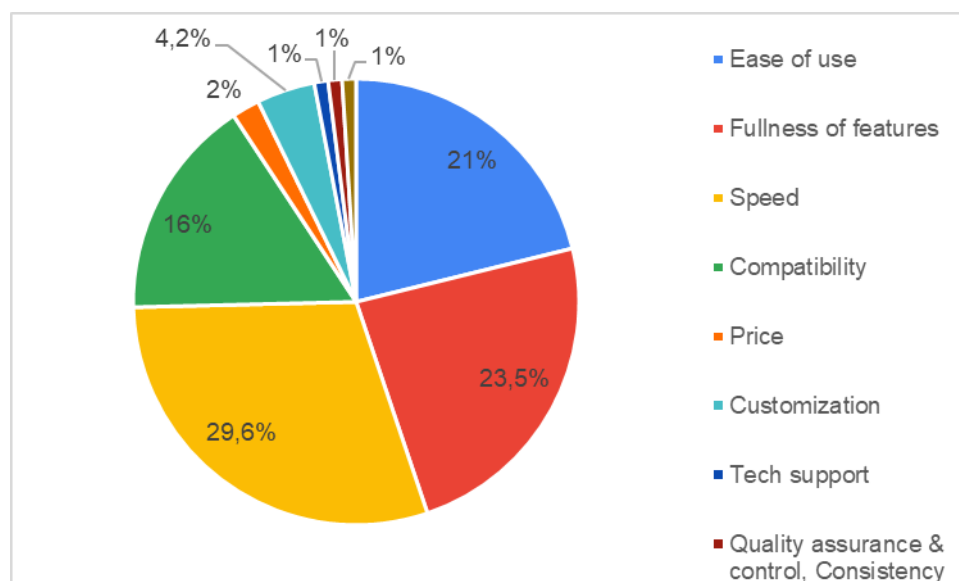
Figure 9.   Respondents' answers to the question: What is the most important feature of CAT tools, in your opinion?

There seems to be a correspondence between the usage of CAT tools and computer skills that translators possess. Just about half of the respondents who reported using CAT tools, rate their computer skills as excellent (see Figure 10). The overall responses averaged out to 4.43. Non-CAT tool users also rated their computer usage skills relatively high, with most respondents (53.8%) rating their skills as 4 (the mean score being 4.31). The reason for this slight difference might be attributed to age, but the sample size is too small to draw any relevant conclusions.
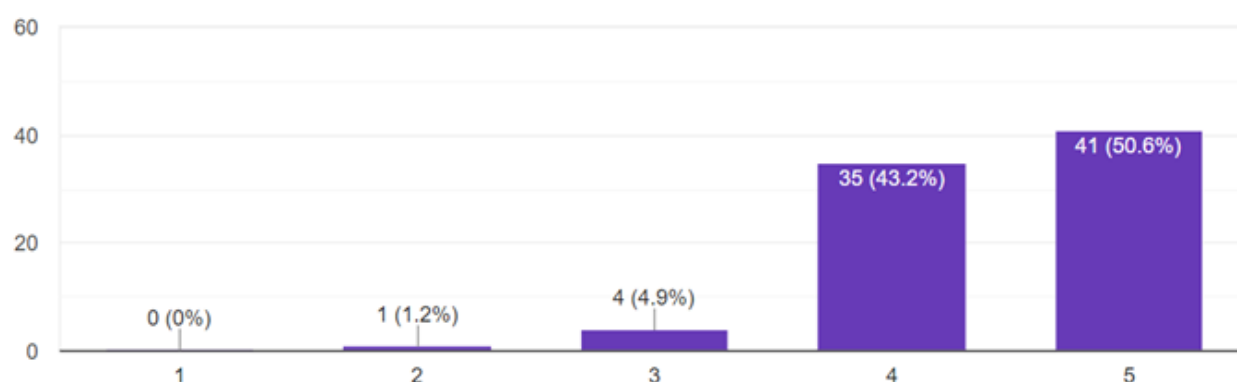

Figure 10. Respondents' answers to the question: With 1 being poor and 5 being excellent, how would you rate your computer usage skills?

When the respondents who do not use CAT tools were asked which CAT tools they have heard of, most (N=10) reported having heard of Trados Studio, while they seemed to be less familiar with other CAT tools, such as memoQ (N=6),

Wordfast Pro (N=6) and Memsource (N=5), and three respondents reported not having heard of any CAT tools (Figure 11).
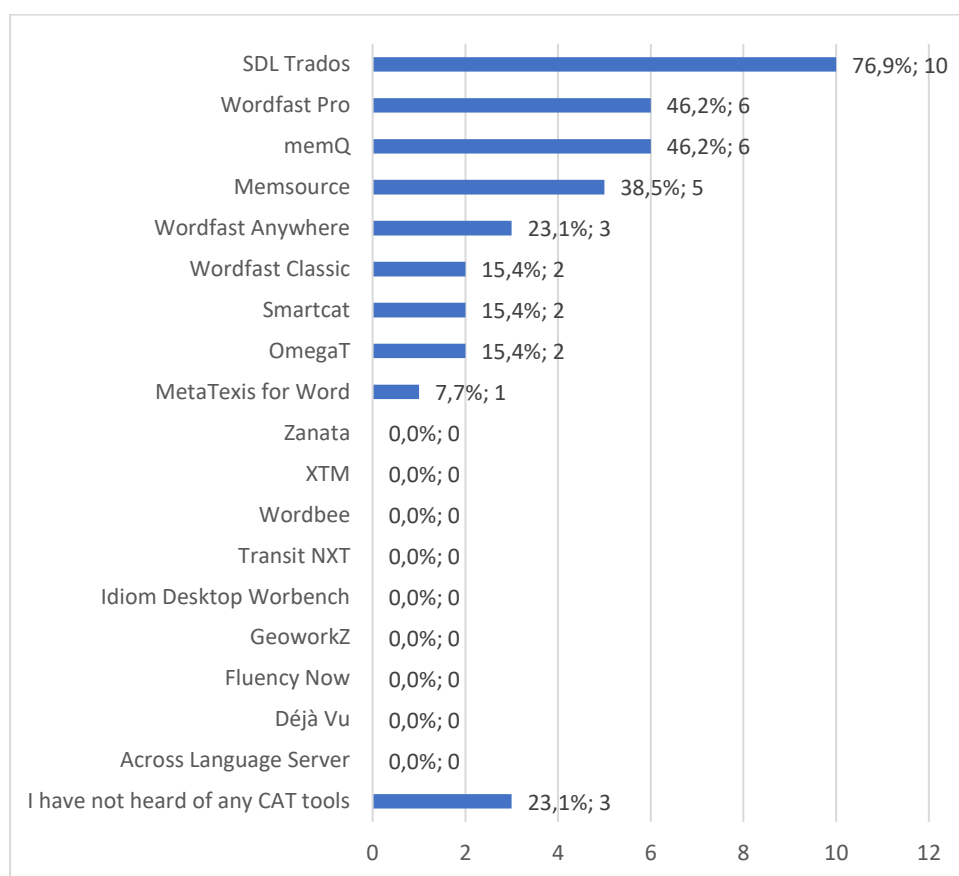

Figure 11. Non-CAT users' answers to the question: Which, if any, of the below listed CAT tools have you heard of?

The non-users' listed reasons for not using CAT tools include "lack of time needed to learn how CAT tools work" (N=9) and "unsuitable for the field in which I translate" (N=5) (Figure 12), which is in line with the results shown in Figures 4 and 5, where the text types differ between those translators who do use and those that do not use CAT tools. Cost was listed by four respondents as another significant reason for not using CAT tools. Out of those respondents who do not use CAT tools, two respondents reported having difficulties in deciding which CAT tool to use, which is not surprising, as the CAT tool market is relatively large with many tools to choose from. Furthermore, two respondents also reported facing difficulties in learning how CAT tools work. One of the respondents, who had tried using CAT tools in the past, was very critical of them, calling them "soulless tasks that suck the life out of translators", adding that CAT tools create tedious texts which are unpleasant to fine-tune afterwards.
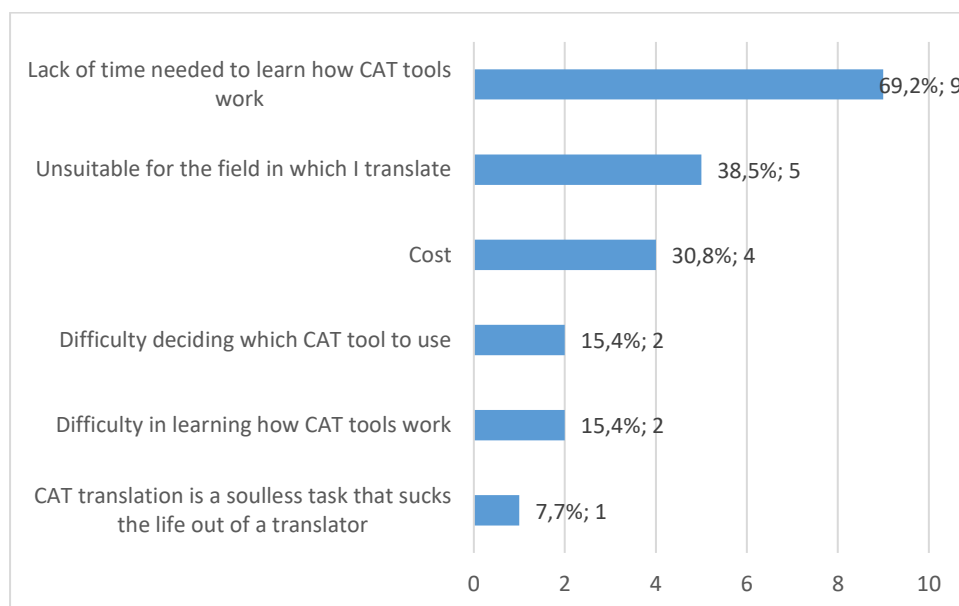
Figure 12. Respondents' answers to the question: What are your reasons for not using CAT tools when translating?

In the final part of the questionnaire the respondents were asked to comment on their experience with CAT tools. Most of the comments were positive in their appraisal of CAT tools, describing them as extremely helpful when translating. One respondent stated that CAT tools continue to improve, also recommending the use of modern MT tools, based on neural MT technology, for Trados Studio. Another respondent stated that what makes CAT tools so effective is their integration with machine translation. Yet another participant suggested there should be a study that examines to which extent translators use the machine translation options offered by many CAT tools (including Trados Studio). As mentioned earlier, one respondent commented that CAT tools are a requirement for translators who work with or for foreign clients, while another believed that higher-education institutions in Croatia do not teach their students how to use CAT tools, i.e., do not prepare them adequately for the job market. Several respondents summarised one of the main strengths of CAT tools, i.e., the ability to store terms once translated and save them for future use, but also the ability to help users to be more consistent in terminology usage. Furthermore, CAT tools, in addition to creating personal TBs for each user, are also capable of storing separate terminologies for each client, which enables users to have consistent translations for each client. Another respondent stressed the importance of CAT tools for the creation, management and utilisation of terminology. However, even though TBs and TMs expedite the translation

process, one respondent noted that creating a solid database is a time-consuming process, meaning that it will take a translator many translations and man-hours of work before they notice a significant increase in efficiency in their translation process, or before they have a *billable* result.

6. Conclusion

Translation as a process has experienced a shift in recent years and translators are required to possess other competencies and skills than just linguistic and cultural, most notably translation technology skills. Technology has in a way redefined the translation process and the role of the translator. There has also been a shift in how translators are perceived by clients, and how they perceive themselves. Like many professionals, translators are required to have interdisciplinary skills and competencies.

Many translators today use CAT tools, primarily because they make the translation process more efficient, but also because many clients require translators to use them. This study has shown that the majority of freelance and in-house translators in Croatia use CAT tools, especially those who work with or for foreign clients. The study has also confirmed that the majority of those translators have largely positive opinions on CAT tools and consider them to be helpful. The most used CAT tool among translators in Croatia is Trados Studio, although Memsource is also quite widespread, presumably due to the fact that it is cloud-based.

However, this survey has only included the subjective opinions on the degree of efficiency of the translation process with CAT tools, so in future studies a more objective measure of usefulness of CAT tools and features in translation should be employed, e.g., a word-per-hour test. Nevertheless, the study has important implications for translator training, showing the importance of computer skills which have become an indispensable part of translation competence in the modern era. Furthermore, the current trends in standardisation of products for sharing, crowdsourcing and collaborative translations suggest that they might become more common among translators. This survey should be repeated in a few years to monitor the development of CAT tools, and the acceptance of CAT tools by translators in Croatia, particularly taking into account the recent uptake of MT and integration of MT features into CAT tools.

References

Bowker, Lynne. 2002. "Information retrieval in translation memory systems: Assessment of current limitations and possibilities for future development". *Knowledge Organization* 29 (3-4): 198-203.

Bowker, Lynne and Des Fisher. 2010. "Computer-aided translation". In *Handbook of translation studies*, Vol 1, edited by Yves Gambier and Luc van Dorsolateral, 60-65. Amsterdam/Philadelphia: John Benjamins.

Cabré, Teresa M. 2010. "Terminology and translation". In *Handbook of translation studies*, Vol 1, edited by Yves Gambier and Luc van Dorsolateral, 366-370. Amsterdam/Philadelphia: John Benjamins.

Cadwell, Patrick, Sheila Castilho, Sharon O'Brien, and Linda Mitchell. 2016. "Human factors in machine translation and post-editing among institutional translators", *Translation Spaces* 5 (2): 222–43. https://doi.org/10.1075/ts.5.2.04cad.

Castilho, Sheila, Stephen Doherty, Federico Gaspari, and Joss Moorkens. 2018. "Approaches to Human and Machine Translation Quality Assessment". In *Translation Quality Assessment: Machine translation: Technologies and applications*, Volume 1, edited by Joss Moorkens, Sheila Castilho, Federico Gaspari, and Stephen Doherty, 9–38. Berlin: Springer Verlag. https://doi.org/10.1007/978-3-319-91241-7_2.

Chan, Sin-wai. 2017. *The Future of Translation Technology Towards a World without Babel*. Milton Park, Abingdon, Oxon, New York: Routledge.

Craciunescu, Olivia, Constanza Gerding-Salas, and Susan Stringer-O'Keeffe. 2004. "Machine translation and computer-assisted translation: a new way of translating?". *Translation Journal*, 8(3): 1-16.

ELIS 2022. The Results Are In: 2022 European Language Industry Survey. Accessed 10 November, 2022. https://slator.com/2022-european-language-industry-survey/.

Esselink, Bert. 2000. *A practical guide to localization* (Vol. 4). Amsterdam and Philadelphia: John Benjamins. https://doi.org/10.1075/liwd.4.

Esselink, Bert. 2019. "Multinational language service provider as user". In *The Routledge Handbook of Translation and Technology* edited by Minako O'Hagan, 109-126. New York: Routledge.

Hlavac, Jim, and Snježana Veselica Majhut. 2019. "Introduction". In *Translating from Croatian into English: A Handbook with Annotated Translations*, edited by Jim Hlavac and Snježana Veselica Majhut, 9-12. Zagreb: Hrvatska sveučilišna naklada.

Kageura, Kyo, and Elizabeth Marshman. 2019. "Terminology extraction and management". In *The Routledge Handbook of Translation and Technology* edited by Minako O'Hagan, 61-77. New York: Routledge.

Karpińska, Patrycja. 2017. "Computer Aided Translation – possibilities, limitations and changes in the field of professional translation". *Journal of Education Culture and Society* 2, 133-142. https://doi.org/10.15503/jecs20172.133.142.

Kenny, Dorothy. 2020. "Machine translation". In *Routledge Encyclopaedia of Translation Studies* (3rd ed.), edited by Mona Baker and Gabriela Saldanha, 305-310. London: John Benjamins.

King, Patrick. 2019. "Small and medium-sized enterprise (SME) translation service provider as technology user: translation in New Zealand". In *Routledge Handbook of Translation and Technology* edited by Minako O'Hagan, 148-165. New York: Routledge.

Lagoudaki, Elina. 2006. "Translation memories survey 2006: Users' perceptions around TM use". In *Proceedings of the ASLIB International Conference Translating & the Computer* 28 (1): 1-29. London: ASLIB.

Mellinger, Christopher D. and Gregory M. Shreve. 2016. "Match evaluation and over-editing in a translation memory environment". In *Re-embedding translation process research* edited by R. Muñoz Martín, 131–148. Amsterdam/Philadelphia: John Benjamins.

Neather, Robert. 2020. "Collaborative Translation". In *Routledge Encyclopaedia of Translation Studies* (3rd ed.) edited by Mona Baker and Gabriela Saldanha, 70-75. London: Routledge.

O'Hagan, Minako, ed. 2019. *The Routledge Handbook of Translation and Technology*. New York: Routledge.

Omazić, Marija, and Nataša Pavlović. 2022. "Prevođenje u digitalnom okruženju: utjecaj prijevodnih tehnologija na praksu i teoriju prevođenja". In *Jezik u digitalnom okruženju,* edited by Maja Glušac and Ana Mikić Čolić, 11-26. Zagreb: Hrvatsko društvo za primijenjenu lingvistiku.

Rajh, Ivanka, Mirna Koričan Lajtman and Marija Omazić. 2021. "Acceptance of Machine Translation by Croatian Translators". In *The 2nd International Conference on the Relation between Artificial Intelligence, Social Sciences and Humanities,* 29-30. Zagreb.

Quah, Chieu Kin. 2006. *Translation and Technology*. New York: Palgrave Macmillan.

Steurs Frieda, Iulianna van der Lek-Ciudin, and Tom Vanallemeersch. 2016. "How translators work in real-life: SCATE observations". *Translating Europe Forum*, 2016. European Commission, Brussels. http://www.ccl.kuleuven.be/scate/TEF.pdf.

Tabor, Jared. 2013. "CAT tool use by translators: What are they using?" Accessed on 27 July 2021. https://blogproz.wordpress.com/2013/03/28/cat-tool-use-by-translators-what-are-they-using/.

Vukalović, Nino (2021). *An Analysis of Computer - Assisted Translation (CAT) Tools.* MA thesis. Rijeka: Faculty of Humanities and Social Sciences.

Wheatley, Alan. 2003. A Major Breakthrough for Translator Training. March 2003. https://www.translationdirectory.com/article450.htm, Accessed 15 October 2020.

CAT tools

Across Language Server: https://www.across.net/en/across-language-server

memoQ, https://www.memoq.com/

Memsource, https://www.memsource.com/

OmegaT, https://omegat.org/

RWS Trados Studio, formerly SDL Trados Studio,
   https://www.trados.com/resources/downloads/

Smartcat, https://www.smartcat.com/

Transit NXT, https://www.star-ts.com/software/translation-memory-transit-nxt/

Wordbee, https://wordbee.com/

Wordfast, https://www.wordfast.com/

XTM, https://xtm.cloud/

UPORABA ALATA ZA RAČUNALNO POTPOMOGNUTO PREVOĐENJE MEĐU HRVATSKIM PREVODITELJIMA

Sažetak

U današnje se vrijeme, kako potražnja za brzim i točnim prijevodima raste, prevoditelji sve više oslanjaju na računalnu tehnologiju kako bi olakšali proces prevođenja. U tom smislu, alati za računalno potpomognuto prevođenje (CAT) i programi za strojno prevođenje (MT) postali su neizbježni u svakodnevnom radu. Ovim se istraživanjem pokušalo dati jasniju sliku o uporabi CAT alata, posebice među hrvatskim prevoditeljima, s obzirom na vrste alata koji se koriste, u kojoj se mjeri koriste i u kojoj mjeri olakšavaju i/ili ubrzavaju proces prevođenja. Rezultati

se uspoređuju s prethodno provedenom anketom među prevoditeljima diljem svijeta na istu temu. Uzorak za anketno istraživanje činila su 94 prevoditelja registrirana u Hrvatskoj s različitim iskustvom u prevođenju i jezičnim parovima. Rezultati su pokazali da veliki postotak prevoditelja koristi CAT alate, ali se ne slažu oko njihove ukupne učinkovitosti.

Ključne riječi: računalno potpomognuto prevođenje, strojno prevođenje, alati za računalno potpomognuto prevođenje, prevoditelji