

An Analysis of Computer - Assisted Translation (CAT) Tools

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UNIVERSITY OF RIJEKA

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An Analysis of Computer-Assisted Translation (CAT) Tools

Submitted in partial fulfillment of the requirements for the M.A. in English Language and
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Abstract

Modern translations have become increasingly reliant on computers, with translations that use computer technology being split into computer-assisted translation (CAT), and machine translation (MT). Programs which translators (TRLs) use during the process of computer-aided translation are called *CAT tools*. This study attempts to investigate the use of CAT tools among TRLs in Croatia to find out to what extent these tools are used by TRLs, which CAT tools are used most commonly, and among other things, how much they increase the efficiency of the translation process.

Key words: computer-assisted translation, CAT tools, Croatian, English

List of abbreviations:

CAT – Computer-assisted / Computer-aided translation

MT – Machine translation

TM – Translation memory

TRL - translator

ST – Source text

TT – Target text

SL – Source language

TL – Target language

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1. Introduction

Translation can be defined as the process of rendering words/phrases/ a text from one language into another (Merriam-Webster Dictionary) or a product of such a process. Such a definition is naturally very simplified, and the process is far more intricate in reality. Such is the opinion of Bassnett (2013), who argues that translation is not a straightforward process that can be carried out by everyone, as it “involves complex negotiation between languages” (p. 3). When translating, TRLs must both interpret the ST and reformulate the meaning in another language. This can be a difficult process, as different languages have different syntax, structures and vocabulary, and the TL often has no equivalent for an idea articulated in the SL.

In today’s increasingly globalized world, where the demand for translation growing, as well as with new developments in technology, translations have become more sophisticated, increasingly relying on computer technology to facilitate the process. Computer translations have become a necessity for TRLs in today’s globalized information age, to translate large amounts of text quickly (Esselink 2000; Lagoudaki 2006, as cited in Bowker & Fisher, 2010). Depending on the technology used, translation can be divided into three types: human translation, machine / mechanical translation (MT), and computer-assisted / computer-aided translation (CAT).

This study will mostly be focused on CAT and the analysis of its tools, although CAT and MT will also be briefly compared.

2. Computer-assisted translation tools

2.1. Computer-assisted translation vs machine translation

As computers have become an integral and crucial part of every aspect of our life, translation without the use of computers is nowadays impossible. Using a computer makes the translation process easier and faster. Hutchins (2003, p.2) lists some reasons why computers are used in translation:

- To lessen the amount of work for TRLs
- Technical materials can be very monotonous to translate for humans
- Computers provide consistency
- Quicker results
- In the case of machine translation, some translations can be completely performed with a computer and do not require a human TRL
- Cost reduction

Translation performed by computers can be divided into computer-assisted translation and machine translation. In computer-assisted translation, the translation is primarily performed by a human TRL, with the assistance of computer software that facilitates some aspects of the translation process. This is the main difference between CAT and MT, in which the translation is done primarily by a computer. Bowker & Fisher (2010, p.60) consider translation as something that should be looked at on a “continuum of translation possibilities”, with varying degrees of

human or computer assistance. CAT is located in the middle of the continuum, between human translation on the one end and machine translation on the other end.

The terms *Computer-assisted Translation* and *Machine Translation* can be confusing for non-specialists, due to being closely related. Both types of translations use a computer during the translation process. However, as Craciunescu (2004) points out, CAT and MT are each the result of different approaches used in translation; they produce different results and are not used in the same contexts.

Unlike CAT, where the TRL does most of the work with some assistance by a computer, in MT the translation is done primarily by a computer, with possible human intervention during the pre- or post-editing process. (Bowker & Fisher 2010).

Optimism for MT was high in the 1950s, with predictions of fully automatic systems within a few years. However, the optimism faded within a few years, as the importance of the human factor in translation became clear. In 1966, the National Science Foundation, at the request of sponsors of MT, set up the Automatic Language Processing Advisory Committee (ALPAC) which reported that compared to human translation, MT was more expensive, slower and less accurate. Although seen as unreasonably critical, ALPAC's influence brought a virtual end to MT research in the US for over a decade (Hutchins, 2007). According to Garcia (2015), research into MT stalled due to lack of computation power but continued when capacities expanded, despite the aforementioned setbacks.

Today, there is a new type of MT, which uses neural networks to find correspondences between SL and TLs. Neural networks have the advantage of being able to use data to learn complex relationships among natural languages, without having to resort to hard-to-design manual hand features (Srivastava, Shukla & Tiwari, 2018).

There have been attempts to augment CAT with automation from MT, starting in the 90s, but the software was not powerful enough then. In 2006, Lingotek launched a web-based CAT integrated with MT. It was followed by Trados and various other CAT tools. The integration of MT into CAT provides CAT tools with the option of either continuing to work the traditional way, accepting, repairing, and rejecting *exact*, *fuzzy* and *no matches*, or using MT solutions to populate *no matches*, which can then either be accepted, modified, or rejected. However, this technology is still in its infancy, and it is questionable whether it would lead to improvements in time and quality of translations (Garcia, 2015).

2.2 History of CAT Tools

Craciunescu (2004) explains that the main characteristic of computer-assisted translation is the use of a variety of tools that make the work of the TRL quicker and more accurate. These tools are also called *CAT tools*, although they are known by many names, which is a source of some terminological confusion. Garcia (2015) notes that CAT tools have been referred to by various other names in the industry and literature. Some of the names are *CAT software*, *CAT systems*, “*TM (translation memory)*, *TM tools / systems / suites*, *translator workbenches / workstations*, *translation support tools*, and *latterly translation environment tools (TEntS)*” (p. 69). It is worth noting that the term *translation memory* has another meaning, being one of the main components of a CAT tool, which I will explain in detail later in the thesis. Also, the term *Translation Environment Tool (TEnt)* is often used synonymously with *CAT tool*, but it should be noted that there is a slight difference, as CAT tools refer to all the tools and software TRLs use

when translating, while TEnT refers to specific software that integrates all tools into one (Barois, 2018). To avoid confusion, I will be using the term *CAT tools* in all instances in this thesis.

According to Bowker & Fisher (2010), the term *CAT tools* should be applied strictly to software that was specifically designed with translation in mind, to avoid confusion with other tools and software TRLs use when working. This definition excludes tools such as e-mail, spelling checkers, and word processing programs. Following that definition, Microsoft Word, despite being a word processing program and having a spell check feature, is not a CAT tool.

The history of CAT tools is relatively short. Garcia (2015) points out two major periods for CAT tools; the classic era, lasting from 1995 to 2005, and the modern era, encompassing a period from 2005 till present day. The classic period started when CAT tools were fully developed and became available for commercial use around the mid 1990-s, with the decade that ensued being focused on stability and increasing processing power. The modern era is characterized by the increased number of potential scenarios for CAT usage. According to Garcia, “a more granular approach towards text reuse has emerged” and “the amount of addressable data expanded” (p. 69). User interfaces have been simplified, and cloud computing has made CAT tools accessible to a broader audience while also making it possible to integrate TMs with MT. Finally, the power of the Web made it possible for translation aficionados around the world to cooperate on projects, significantly reducing translation times.

Although CAT tools were finalized in the mid 1990-s, their development had started much earlier. Bowker & Fisher (2010) note that the development can be traced to the 1960s, when term banks were created, which allowed storage of large amounts of structured information in computers. Although structured information could be stored in computers, the technology was not yet advanced enough to be used for the purposes of translation, and human translation was still

seen as more efficient. TRLs used typewriters in the 1960s, and kept paper copies of their work, consulting them when the need arose.

One of the main reasons for the development of CAT tools was the frustration of machine translation developers, who were looking to design a product that could assist in producing useable, yet faster and cheaper translations. The ALPAC (Automatic Language Processing Advisory Committee) report of 1966 was critical of machine translation but was supportive of the idea of funding Computational Linguistics, particularly machine-aided human translation, listing reports which showed that using tools such as electronic glossaries can both increase productivity and reduce errors (Garcia, 2015).

Bowker & Fisher (2010) note that the developments in computational linguistics in the late 1970s and early 1980s were crucial for the development of modern CAT tools. These developments made it possible to not only use computers to store, but also search for and retrieve information. Typewriters quickly became a relic of the past with the advent of the personal computer, which was one of the key factors that allowed the emergence of computer-assisted translation. Personal computers made possible the storage of documents in soft copies, while at the same time providing a more convenient way of querying them. In 1984, possibly foreseeing the future importance of computers for translations, two German TRLs, Jochen Hummel and Iko Knyphausen, established Trados (TRANslation & DOcumentation Software) which was initially established as a provider of language services (1984-1989) (Garcia, 2005). Trados would later go on to become the most widely used CAT tool.

The first prototype of a CAT tool, known as the Translation Support System (TSS) developed by ALPS (Automated Language Processing Systems) in Utah emerged in the mid-1980s. TSS contained a multi-word processor and had a terminology management system,

allowing access to previously translated segments. However, the technology had not yet been developed enough for ALPS to profit from its software, and TSS was taken off the market by the late 1980s (Garcia, 2005).

By the early 1990s, technology had developed to such a degree to allow for the commercialization of CAT tools, and technologically proficient TRLs with a penchant for business pursued the opportunity, as competition suddenly became fierce. In 1990, Trados launched their terminology database named MultiTerm. In 1992, the first version of the Translator's Workbench TM tool was launched. The same year, other programs were launched, such as IBM Deutschland's Translation Manager 2, and STAR AG's Transit. Over the next few years, many other CAT tools were launched, many of which were shortly discontinued, with the notable exception of Déjà vu, which was launched in 1993 and remains in use until today. Out of all these programs, Trados was the one that became the industry standard, in large part due to successful tender bids to the European Commission in 1996 and 1997. As previously stated, features that were present by the mid-1990s were standardized on the most advanced tools and would stay relatively the same over the course of the ensuing decade (Garcia, 2015).

In 2005, the modern era of CAT tools began. That same year, SDL (Software and Documentation Localization), a multinational services company with headquarters in the United Kingdom, acquired Trados. In 2009, SDL Trados Studio 2009 was released, which saw a shift toward integrating all functions into one proprietary interface. Lingotek, the first web-based tool, was launched in 2006. In 2009, Google launched the web-based Translator Toolkit, aimed at non-professional users. CAT tools of the modern era have recognized the importance of STs and the supply side of translation, and "begun creating authoring tools for precisely the same gains of consistency and reuse" (Garcia, 2015, p.79). According to Garcia, while the classic era of CAT

tools was defined by the amount of computer processing power and connectivity, the modern era has largely been defined by cloud computing and Web 2.0. Cloud computing made local storage and processing largely irrelevant, as all data is now stored remotely, online. Web 2.0. can be defined as a more interactive and collaborative kind of Web, with an emphasis on “social interaction and collective intelligence”, and social media websites such as Youtube, Myspace (which was superseded by Facebook) and others (Murugesan, 2007, p.34). For CAT tools, this means that users now take on a more active role, and user experience and feedback have gained more importance (Garcia, 2015).

As can be seen from this overview, CAT tools have developed quickly over the last few decades, alongside the rapid evolution of technology. Esselink 2000; Lagoudaki 2006 (as cited in Bowker & Fisher, 2010) conclude that CAT tools have become increasingly more accessible, popular, and affordable, and have become a necessity for TRLs in today’s globalized information age, in order to translate large amounts of text more quickly. Along with that, the process of computer-assisted translation has become increasingly more streamlined, as modern CAT tools have integrated various components such as termbases and TMs and have made their interfaces more user-friendly.

2.3 Main components of CAT tools

According to Craciunescu (2004), the two most important components of CAT tools are *terminology databases* and *translation memories* (see section 2.2), and they provide the foundation of all CAT tools.

A terminology database (also called a *glossary*, *termbase*, or *lexicon*) can be defined as a standardized dictionary, in which TRLs can check meanings, translations and spellings of words. (Soluling, accessed on August 22, 2021). In other words, it is a centralized database containing various technical or industry specific words. It combines images, reference materials and terms that are pre-approved, and allows TRLs to share them in real-time, which makes the translation process faster (especially if it is also automated), as well as more consistent, as the same term can always be translated in the same way. The primary benefit of using a terminology database is that it saves time translating, especially with texts that contain large amounts of specialized content, as the TRL does not have to spend a lot of time researching specialized terminology. Instead, they can quickly find correct translations of key terms. Other benefits include the elimination of ambiguity within an abundance of specialized content and help with the management of key terminology (Language Scientific, 2015).

Terminology bases are usually integrated into CAT tools. However, there are also termbases that can be accessed online without using a CAT tool, such as the Croatian Struna (struna.ihjj.hr) or IATE (Interactive Terminology for Europe), as illustrated below.

The screenshot shows the IATE search interface. At the top, there is a search bar with the text "translezijska sinteza" and a search button. Below the search bar, there are options for "Source language" (with "hr" selected) and "Target language". There are also checkboxes for "Search in term types" including Term, Abbrev, Formula, Phrase, Short form, Lookup form, and all. Below the search bar, there is a "Results 1-1/1" section showing the search results in a table.

hr	en	Additional information	Collections
translezijska sinteza	translesion synthesis TLS translesion DNA synthesis ↓	3562571 ★ 🔍 📄 📄 📄 📄 📄 📄 📄 📄 📄	LIL COM-Toxicology

Figure 1 IATE Terminology Base Interface. Source: <https://iate.europa.eu/home>

Although the terms *termbase* and *glossary* are often used interchangeably, it should be noted that there is a slight difference in meaning, as the term changes depending on the format. For example, a *termbase* is usually in a format that can be incorporated into translation software automatically. A *glossary* is usually delivered in a format like Excel or Word. The advantage of using these formats is that they can easily be converted into *termbase* formats, so it can be used as a standard format in cases where TRLs do not know which software they will use beforehand (Proz, 2013). In the rest of this thesis, I will be using the term *termbase* to refer to both glossaries and *termbases*, unless it is necessary to stress this difference.

Unlike *termbases*, a TM is used to monitor the process of translation in real-time, memorizing each translated passage. When the TRL encounters a paragraph or a sentence that has already been translated, the TM tool notifies them and allows them to either insert the previously translated text or modify it. TMs are created when a translation or a localization project is started and evolves over the course of it, as new content is translated and therefore stored into memory, meaning that the memory expands with each subsequent translation. An expanded TM is a valuable resource for future translations. A major benefit of using a TM is consistency: the same phrases can always be translated in the same way; therefore, multiple TRLs can work on a project and use consistent phrasing and terminology. TMs also reduce the cost of translation, time spent translating, and lower the turnaround time of the translation and localization processes (Language Scientific, 2015).

Bowker & Fisher, (2010) offer a more technical clarification of how TMs work. They explain that TMs store both ST and TTs in its database as bitexts (bitexts are a collection of aligned texts, source and target, that are considered equivalents of each other). The texts are divided into segments, which are usually sentences, although Garcia (2015) notes that they can also be “a title,

caption, or the content of a table cell” (p. 71). Each segment from the ST is then linked to the corresponding segment in the translated TT. When translating a new text, the TM again divides the new text into segments and compares them with the segments stored in its database. Pattern-matching is used to identify whether any portion of the text has already been translated as part of a text from the database. When a match is found, the TM presents it to the TRL, and they can decide whether to accept, modify, or reject the displayed match. It should be noted that depending on how similar the two segments are, a different type of match is displayed. Garcia (2015, p.72) describes three main types of matches:

- Exact match (or 100 per cent match): a source segment from the database precisely matches the active segment that needs to be translated. The TRL still needs to check whether the translation can be reused, or if some minor modifications are necessary.
- Fuzzy match: a source segment matches the active one to a degree. The degree is displayed as a percentage and is calculated on the Levenshtein distance, looking at how many insertions, substitutions or deletions are required to get an exact match. To avoid distractions, only segments with a matching percentage of 70 and above are usually offered, although Bowker & Fisher (2010) note that thresholds usually range from 60% to 70%. Depending on the segment offered, the TRL can decide whether to use the proposed segment or start from scratch.
- No match: the TM has failed to find source segments that exceed the match threshold (usually 70%) and no match is offered.

Along with these three main types of matches, some authors add other types. For example, Bowker & Fisher, (2010) for instance, make a more detailed division and describe six types of matches. Along with exact, fuzzy and no matches, they also define *full match*, *sub-segment match*, and *term match*.

Exact match	A segment from the new text is identical in every way to one in the TM database.
Full match	A segment from the new text is identical to one in the TM database save for proper nouns, dates, figures, etc.
Fuzzy match	A segment from the new text has some degree of similarity to a segment stored in the TM database. Fuzzy matches can range from 1% to 99%, and the threshold can be set by the user. Typically, the higher the match percentage, the more useful the match; many systems have default thresholds between 60% and 70%.
Sub-segment match	A contiguous chunk of text within a segment of the new text is identical to a chunk stored in the TM database.
Term match	A term found in the new text corresponds to a termbase entry in the TM system's integrated TMS.
No match	No part of a segment from the new text matches the contents of the TM database or termbase. The translator must start from scratch; however, the new translation can itself go into the TM for future reuse.

Figure 2 Types of matches displayed in TMs (Bowker & Fisher, 2010, p. 61)

While TMS allow TRLs to reuse past translations, and termbases allow the application of correct terminology, another important part of CAT tools are editors. The editor is the main workplace for the TRL, as it is the place where all new source files for translation are opened. If no matches are found from the TM, translations can use the editor to write up a new translation. It can also be used to send finished sentence pairs to the TM, as well as terminology into the termbase. During the classic era, many CAT tools, including Trados and Wordfast, used third-party software as editors, the most prevalent of those being Microsoft Word, although the majority used a proprietary editor (Garcia, 2015).

There are many other components that make up a standard CAT tool, other than the three mentioned. Some of the more common ones are: concordancer, document analysis module, machine translation system, project management module, quality control module, term extractor etc. (Bowker & Fisher, 2010). A brief description of each is provided below.

Component	Brief description
Concordancer	Searches a (bi)text for all occurrences of a user-specified character string and displays these in context.
Document analysis module	Compares a new text to translate with the contents of a specified TM database or termbase to determine the number/type of matches, allowing users to make decisions about which TM databases to consult, pricing and deadlines.
Machine translation system	Generates a machine translation of a segment that has no match in the TM database.
Project management module	Helps users to track client information, manage deadlines, and maintain project files for each translation job.
Quality control module	May include spelling, grammar, completeness, or terminology-controlled language-compliance checkers.
Term extractor	Analyzes (bi)texts and identifies candidate terms.

Figure 3 Most common CAT tool components (Bowker & Fisher, 2010, p. 62)

It should be noted that editors, TM, termbases and the other tools are intertwined. For example, CAT tools usually use a Terminology Management System (TMS), to store and retrieve terminology information from the termbase. Additionally, TMs and termbases can be integrated to make the translation process more automated (Bowker & Fisher, 2010).

2.4 Current trends and future developments

ProZ, the most widely used website dedicated to translation, conducted a survey in 2013 to assess TRLs' attitudes towards CAT tools. Among other things, TRLs were asked which CAT tools they used to determine the market share. According to the results, SDL Trados had the biggest share, with over 80% of TRLs using it. It was followed by Wordfast and memoQ, a CAT tool developed in Hungary, which has been gaining popularity over the last decade.

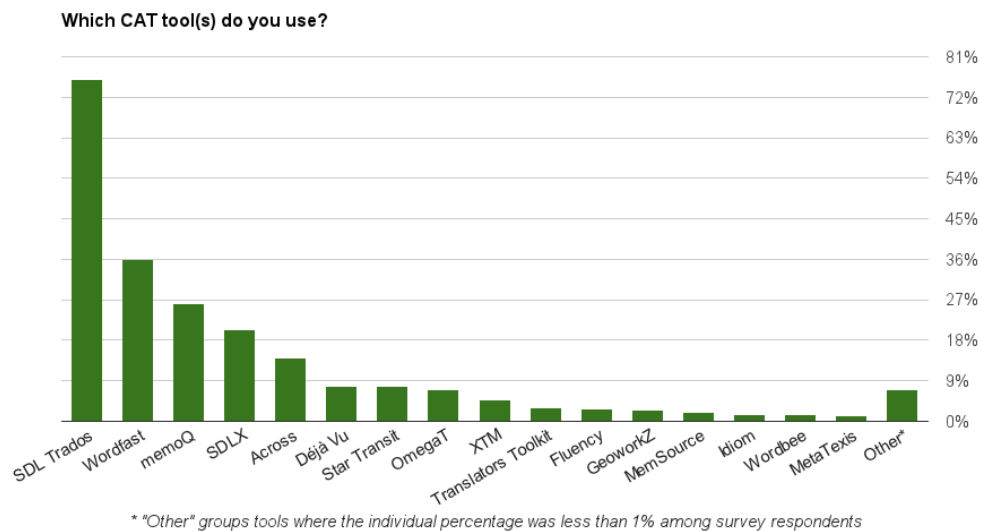


Figure 4 CAT tool usage in 2013 (Tabor, 2013)

The translation market is steadily growing, and CAT is growing with it. According to Kučič (2010), in the EU translation market only, in 1997, there were 1,125,709 pages translated. In 2007, the number reached 1,762,773, and the number has probably grown even more since then, with more and more freelance TRLs being hired to translate, as EU's TRLs find themselves overwhelmed with work. Such a situation suggests CAT is here to stay.

Bowker & Fisher (2010) see the future of CAT as one of emerging possibilities, with CAT continuing to rapidly develop along with technology. Some of the possibilities are improvements in TMs, with the addition of linguistic analysis and the ability to consider the context of matching segments, a feature that is already present in some TMs. Current TMs identify the differences in fuzzy matches, but in the future, they might also be able to indicate which elements of the target segment should be modified or preserved. Along with that, the standardization of products for sharing translations will make sharing translations easier. Finally, the Internet opens up various possibilities for CAT, such as allowing for the crowdsourcing of translations and collaborative translations, connecting TRLs from all over the world, and allowing them to share their knowledge, which will undoubtedly lead to further improvement of CAT tools.

3. The present study

This study consists of two parts. In the first part a questionnaire is used to elicit information on the extent of CAT tools used by TRLs in Croatia and the most frequently used ones as well as the reason for using or not using CAT tools.

The second part of the study consists of an analysis of SDL Trados, the most popular CAT tool on the market. The aim is to see how this particular CAT tool facilitates the translation process, and how quickly someone who does not have prior experience with using CAT tools can get familiarized with the program and start using it effectively.

3.1 Research context and aims

The present study investigates the use of CAT tools among TRLs in Croatia, in particular which CAT tools they use, how they use them, as well as the general sentiment on CAT tools. The study is especially significant as, to my knowledge, no previous studies on this topic specifically concerning TRLs in Croatia have been conducted, or published yet. In 2013, Proz (Tabor, 2013) surveyed TRLs around the world to determine which CAT tools TRLs used and how they used them. The present study is based on Proz's study, with the purpose of finding out how much the market has changed in the last 8 years, while limiting the participants to those TRLs working in Croatia.

3.2. Research questions

The study was guided by the following research questions:

1. To what extent are CAT tools used by translators in Croatia?
2. Which CAT tools are used most commonly by translators in Croatia?
3. How much does the use of CAT tools increase efficiency when translating?

3.3. Participants

The sample comprised 94 participants who work as TRLs in Croatia. Most of the participants (N=31, 33%) are aged 25-34, 26 of them (27.7%) are aged 45-54, and 25 of them (26.6%) are aged 35-44. 11 (11.7%) participants are aged 55 and over, while 1 participant (1.1%) is under 25 years of age. 81.9% (N=77) of participants identified as female, while 18.1% (N=17) identified as male.

Most participants (N=41, 43.6%) have 5-15 years of translation experience. 26.6% (N=25) of them have 16-25 years of experience, followed by 16% (N=15) with under 5 years, and 13.8% (N=13) with more than 25 years of translation experience. Most participants (N=78, 83%) are freelance TRLs, while 17% (N=16) are in-house TRLs. 70.2% (N=66) work as full-time TRLs, while 29.8% (N=28) work as part-time TRLs.

When it comes to language combinations, as expected, most participants' (81.91%) working languages are English and Croatian, with other significant combinations being Croatian and German (31.9%), Croatian and Italian (21.28%), Croatian and French (14.89%), and Croatian and Spanish (7.4%). Other languages reported were (in alphabetical order): Bulgarian, Chinese, Czech, Hungarian, Polish, Russian, Serbian and Slovenian.

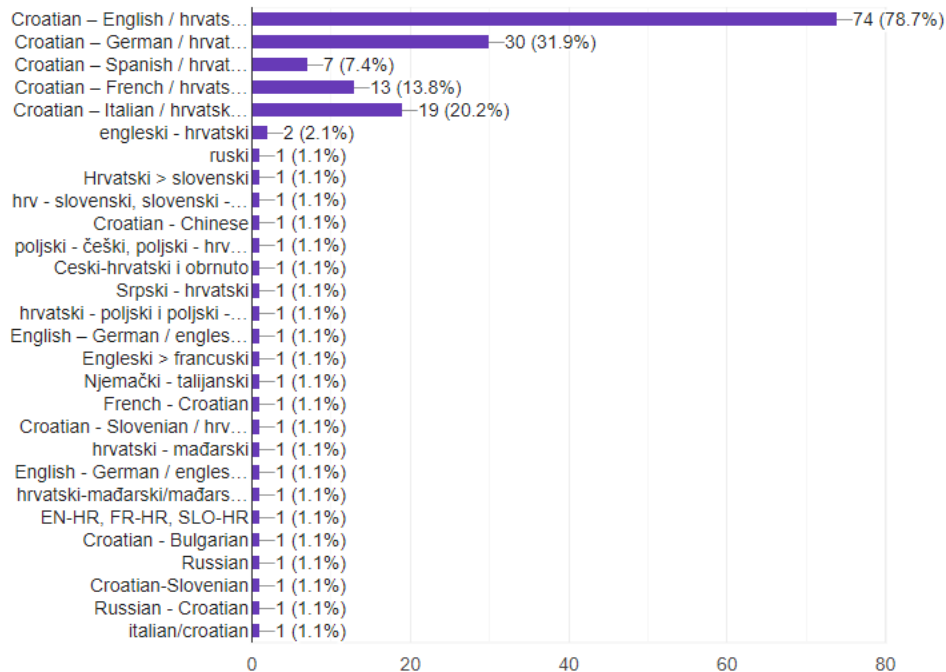


Figure 5 Language combinations of the respondents

3.4 Materials

For the first part of the analysis, an online questionnaire compiled both in English and Croatian was used to collect information. The questionnaire was created with Google Forms and was open for a week. It was partially based on the survey carried out by Proz in 2013 (Tabor, 2013). The questionnaire was sent by e-mail to various freelance TRLs and translation agencies throughout Croatia and was also posted in the group *Prevoditelji* on Facebook.

The questionnaire was composed of three parts. The first part consisted of demographic and contextual data, such as the participants' age, sex, years of translation experience, whether they are a freelance or in-house TRLs, whether they translate full-time or part-time, what their language combinations are, what types of texts they translate, and finally, whether they use CAT

tools or not. Based on the answers they provided, the questionnaire took the participants to the second or third part. The first part comprised 6 multiple choice questions and one Yes/No question. An “Other” textbox was added in one multiple choice question, and one multiple choice question had more than one selectable option.

The second part of the questionnaire was reserved for those TRLs that use CAT tools. Among other things, it was designed to find out how long they have been using CAT tools, which tools they use in particular, whether their clients require them to use certain tools, and if they think CAT tools help them be more efficient when translating. It comprised 9 multiple choice questions, 3 Yes/No questions and one rating question with options 1-5. Two multiple choice questions had more than one selectable option.

The third part of the questionnaire was reserved for TRLs that do not use CAT tools. It was designed to gather information on what their reasons for not using CAT tools are. It comprised 3 multiple choice questions and one rating question with options 1-5. One multiple choice question had more than one selectable option.

The final part of the questionnaire consisted of one optional open-ended question, asking the participants if they have any additional comments related to their experience with CAT tools.

For the second part of the analysis, a five page-excerpt of a document was selected from the Republic of Croatia’s Ministry of Science and Education’s website at mzo.gov.hr. to be translated into English. The document is titled *Metodologija za prikupljanje podataka o obrazovnim i profesionalnim putevima studenata prema njihovom socijalnom i ekonomskom statusu* in Croatian, or *Methodology for collecting data on the educational and professional pathways of students according to their social and economic status* in English. The document is administrative and contains instructions on how to collect data on the professional pathways of

students according to their socioeconomic status. The document was partially chosen as being administrative means that translation is more straightforward than e.g., translating a literary text. The document also has an official English translation which was used as a reference for the analysis. Another document was used to create a TM. The document is titled *Preporuke za organizaciju rada u razrednoj nastavi i upute za vrednovanje i ocjenjivanje u mješovitom modelu nastave* in Croatian, or *Recommendations for organization of teaching for lower primary education and Guidelines for assessment and grading in combined teaching model* in English.

4. Results

4.1 Results and discussion

86.2% of participants reported that they use CAT tools when translating, while 13.8% said they did not use them. In reality, it is likely that there is a higher number of TRLs that do not use CAT tools, but the results might be skewed as this study was specifically looking for those TRLs that use CAT tools. Of those using CAT tools, 32.1% have been using them for 7-15 years, 30.9% for 3-7 years, 18.5% for 1-3 years, 9.9% for more than 15 years, and 8.6% reported that they have been using them for less than a year. 60.5% of TRLs use more than one CAT tool. The majority (69.1%) of the participants that use CAT tools reported working for both domestic and foreign clients.

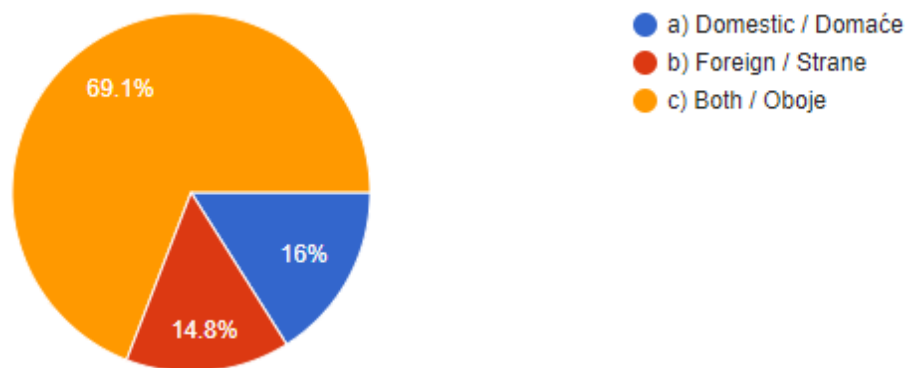


Figure 6 Responses to the question: Are your clients domestic (Croatian) or foreign?

More than half of those TRLs that use CAT tools (56.8%) reported that their clients require them to use a CAT tool when translating. One participant correctly noted that there was an option

missing in the question, noting that some of their clients require TRLs to use CAT tools, while others do not, so this should be considered. Another participant noted that CAT tools are widely used abroad, commenting that it is almost impossible to find a foreign client that does not require the use of CAT tools.

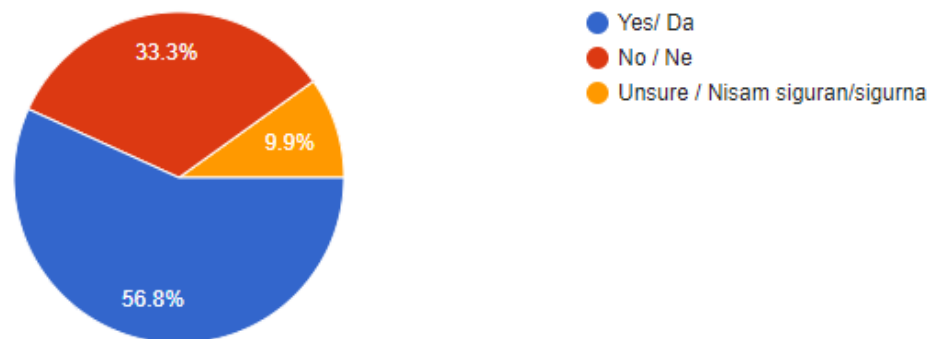


Figure 7 Responses to the question: Do your clients require you to use a CAT tool for translation?

Regarding the types of texts they translate, there were no clear majorities, although it is worth noting that among the TRLs that use CAT tools, 76.5% of them mostly translate technical texts such as user guides and manuals, while only 7.7% of those that do not use CAT tools translate such texts. A similar situation is present regarding software localizations, with percentages of 43.2% and 7.7%, respectively.

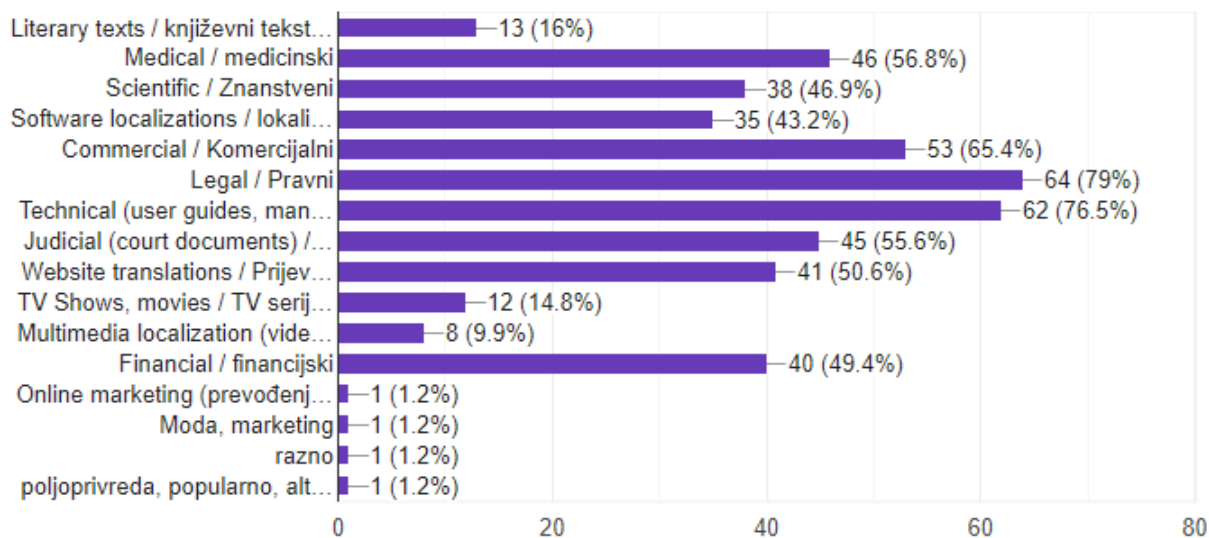


Figure 8 Text types for participants that use CAT tools

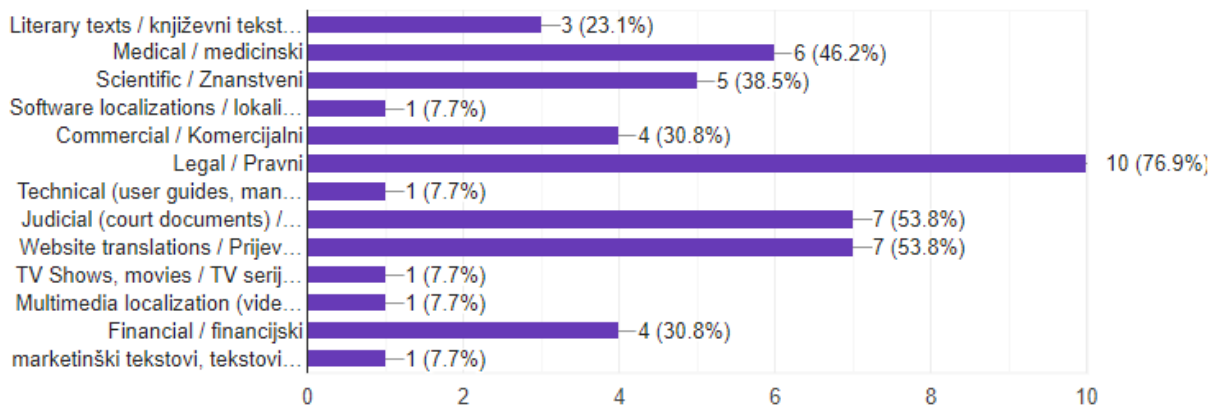


Figure 9 Text types for participants that do not use CAT tools

When it comes to the usage of specific CAT tools, the results show that, among TRLs in Croatia, SDL Trados remains the most widely used CAT tool, with 82.7 of TRLs that use CAT tools reporting that they use SDL Trados. In second place, somewhat surprisingly, was Memsource, with 46.9% of the market share. For the sake of comparison, Memsource had 2-3% market share in Proz’s 2013 survey (Tabor, 2013). A factor that might explain Memsource’s

rising market share might be the fact that it is cloud-based, stressing the importance of cloud computing in the Internet era. Coming in third was memoQ, with 37% market share, which is around 10% more than it had in Proz's 2013 survey. One notable fact is that all three versions of Wordfast combined were at 22.2%, meaning that either its market share has shrunk from the 36% it had in Proz's survey, or it is not as popular in Croatia. Other CAT tools that had more significant percentages were, in alphabetical order, Across Language Server, OmegaT, Smartcat, Transit NXT, Wordbee and XTM. One participant chose Google Translate as the CAT tool which they use, although Google Translate is a machine translation tool, not a computer-assisted translation tool. The complete list can be seen in Figure 10.

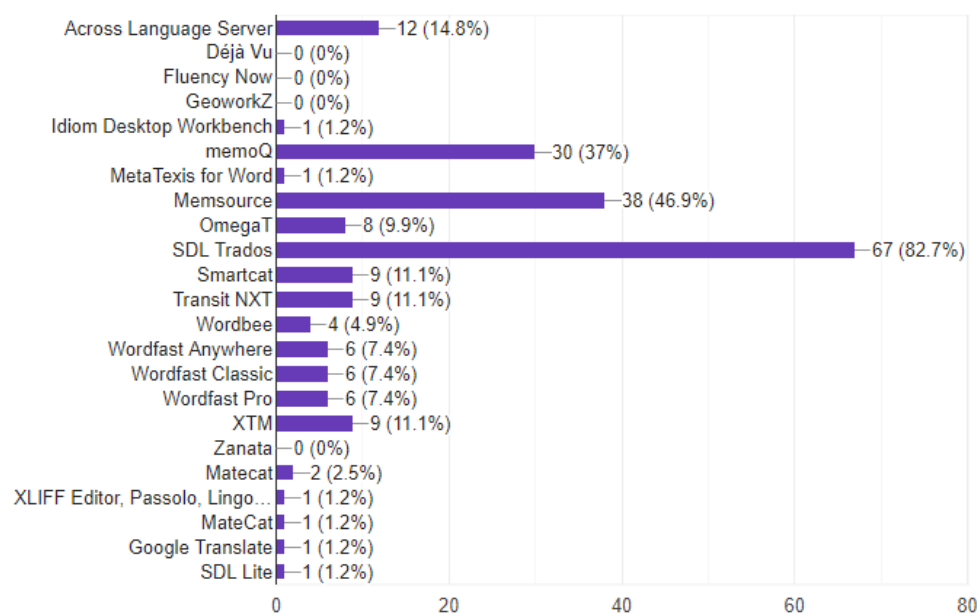


Figure 10 Responses to the question: Which CAT tool (s) do you use?

Regarding which CAT tool they use most frequently, more than half (50.6%) of the participants chose SDL Trados. In second place was Memsourse with 11.1%, followed by memoQ

at 3.7%, It is worth noting that both in this and the next question, a smaller number of participants (22.2% and 19.8%) reported using only one CAT tool, compared to 39.5% who originally reported using only one CAT tool. This discrepancy might have been caused by several reasons. Firstly, participants that use only one CAT tool did not choose the corresponding option and simply chose the only CAT tool that they use as their favorite / the one they use most frequently. Secondly, I split Wordfast into three versions, so it is possible that those TRLs that use more than one version of Wordfast might have chosen the version they use the most, while originally, they considered it to be one CAT tool. Finally, although unlikely, some participants might have considered it irrelevant that they use multiple CAT tools when answering the original question and remembered which CAT tools they use when they were offered the list to choose from.

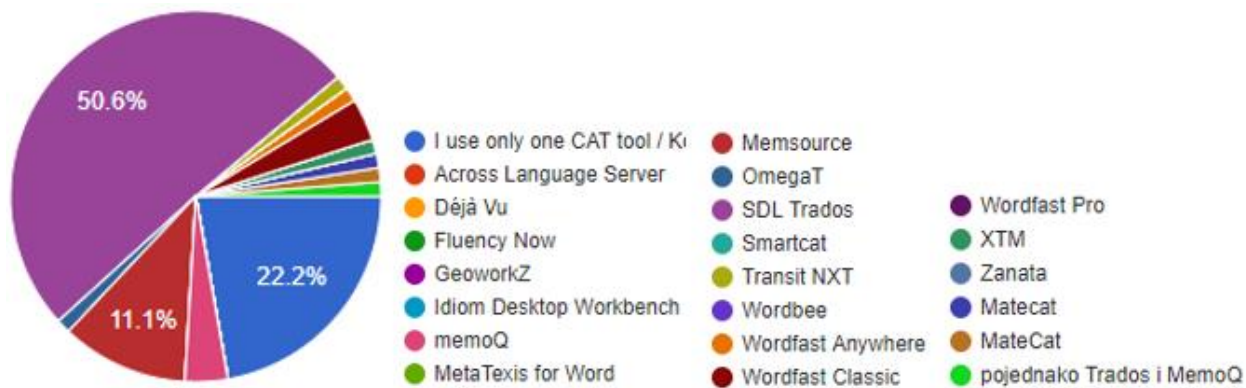


Figure 11 Responses to the question: Which CAT tool do you use most frequently?

Regarding the participants' favorite CAT tool to use, Trados once again came out on top, with 48.1% of participants reporting it was their favorite CAT tool to use. As 82.7% of participants reported using SDL Trados, this means that most of the TRLs that use SDL Trados and another

CAT tool, prefer SDL Trados, although this percentage should also be taken with a grain of salt because, as noted for the previous question, TRLs that only use SDL Trados might have also chosen it as their favorite CAT tool. In second place was Memsource again, with 11.1%, the same percentage of participants choosing it as both their favorite CAT tool, and the one they use the most. MemoQ came in third place again, but with twice as many participants (7.4% as opposed 3.7%) choosing it as their favorite tool, as opposed to one they use the most. It can be seen from the numbers that when deciding on their favorite and most used CAT tool, around five times as many participants chose SDL Trados as opposed to the second place Memsource. Taking into consideration that Trados is used by 82.7% of CAT tool-using TRLs while Memsource is used by 46.9%, at face value it can be concluded that most TRLs that use Trados see it as their favorite tool or use it most often, while less than a quarter of Memsource’s users see it as their favorite or use it as their primary tool. Also, of note here is that 3.7% of participants chose Wordfast Classic as their favorite CAT tool to use, which is half of the number of participants that reported owning it.

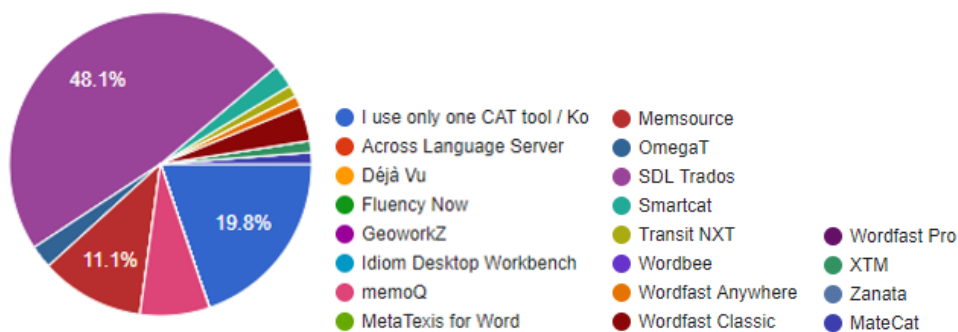


Figure 12 Responses to the question: Which is your favorite CAT tool to use?

On the topic of owning CAT tools they do not use, most (74.1%) of the participants reported not owning any CAT tools they do not use, although memoQ (4.9%), OmegaT (4.9%) SDL Trados (4.9%) and Wordfast Pro (3.7%) also had significant percentages. Other reports were, in alphabetical order, Memsorce (1.2%), Transit NXT (1.2%), Wordfast Anywhere (1.2%), Wordfast Classic (1.2%), various (1.2%) and “all except Omega T, SDL Trados and Matecat” (1.2%). Of note here is that half of the participants that reported owning Wordfast Pro reported that they do not use it.

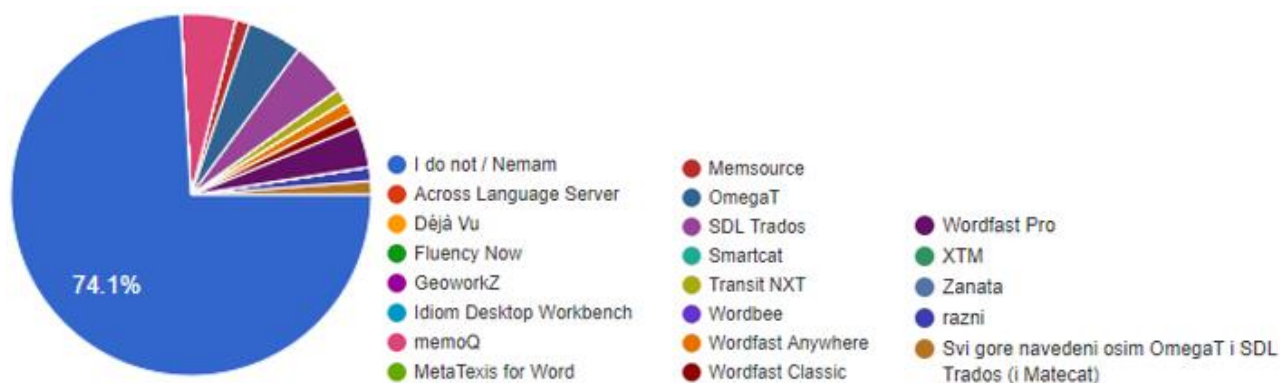


Figure 13 Responses to the question: Do you own a CAT tool you do not use?

On the topic of CAT tools and efficiency, 95.1% of participants agreed that they translate more efficiently when using CAT tools, while only 4.9% disagreed. When the participants were asked to estimate exactly how much their efficiency is increased when using a CAT tool to translate, the answers were diverse. Most (23.7%) reported being 20-30% more efficient when translating with a CAT tool, which is not a drastic increase, but is nonetheless significant. Other options chosen were 40-50% more efficient (19.7%), 30-40% more efficient (13.2%), 50-60%

more efficient (9.2%), 70-80% more efficient (9.2%), 60-70% more efficient (6.6%), 10-20% more efficient (5.3%) and 90-100% more efficient (2.6%). 10.5% of participants reported being unsure of the exact increase in efficiency. However, none of the participants estimated their efficiency to increase by 80-90% when using CAT tools. Excluding the “unsure” answers, and if the average of all the answers is considered, it comes out to 43.5%, meaning that on average, the participants reported that their efficiency is increased by more than 40% when using CAT tools.

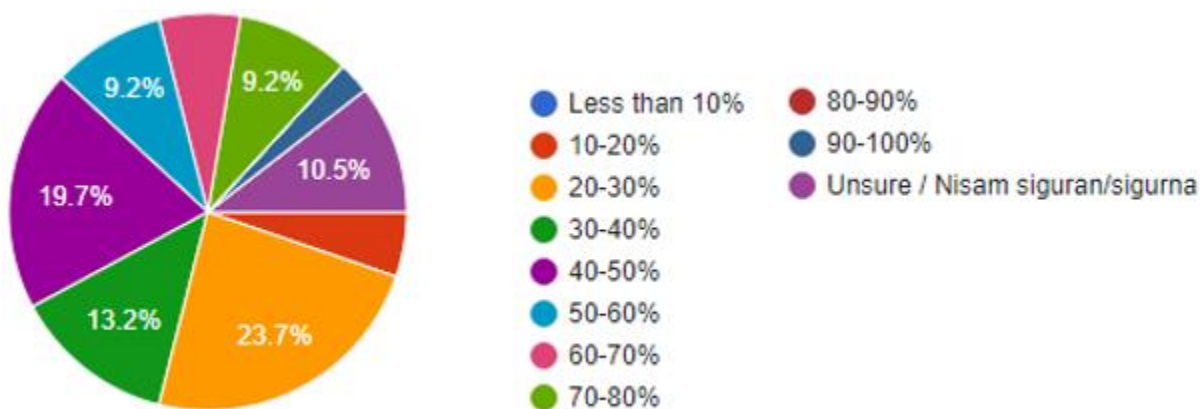


Figure 14 Responses to the question: *By your estimation, how much is your efficiency increased when translating using a CAT tool?*

When it comes to ranking which features are the most important when it comes to CAT tools, most (29.6%) of the participants chose speed, which is an understandable answer, given that TRLs are expected to translate texts quickly, and this is sometimes even more important than giving completely accurate translations. The next highest option was fullness of features (23.5%), followed by ease of use (21%), and compatibility (16%). These four options seem to be the most important when discussing CAT features. The other options picked were customization (4.9%), tech support (1.2%) price (1.2%) and two features reported by the participants, TMs and quality

assurance & control, both at 1.2%. Of note is that the price of a CAT tool does not seem to be very important to professional TRLs, provided the other features are present. For the sake of comparison, as listed on their site, the newest full version of SDL Trados, Trados Studio 2021, is priced at 385€ (down from 695€), while the price of the version that supports two PCs simultaneously is 475€ (down from 855€). The price of an annual subscription (One-year license to use Trados) is 295€. The price of Memsource, as listed on their site, starts from \$27 a month for the most basic edition (containing the essential CAT tool features, such as TMs, a termbase, integration with machine translation etc.), all the way to \$350 a month for the most advanced edition.

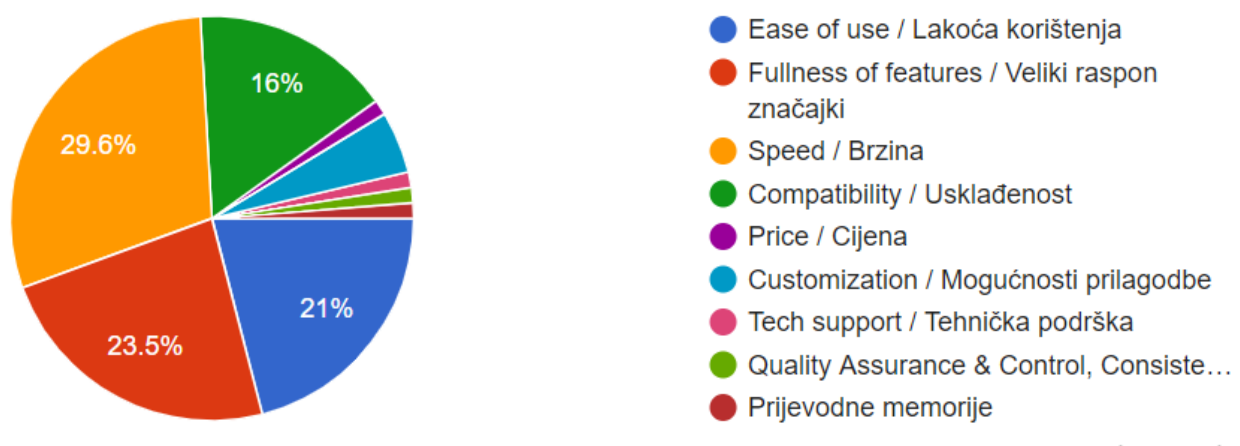


Figure 15 Responses to the question: What is the most important feature of CAT tools, in your opinion?

When the participants that use CAT tools were asked to rate their computer usage skills on a scale from 1 to 5, most (50.6%) rated them as 5. Their responses averaged out to 4.43. In contrast, the participants that do not use CAT tools rated their computer usage skills slightly lower, with

most (53.8%) rating them as 4, and the mean score being 4.31. Although this is not statistically significant (partly because only 13 participants that do not use CAT tools responded to the questionnaire), it might imply that users of CAT-tools perceive themselves as slightly more skilled in the use of computers compared to participants that do not use CAT tools.

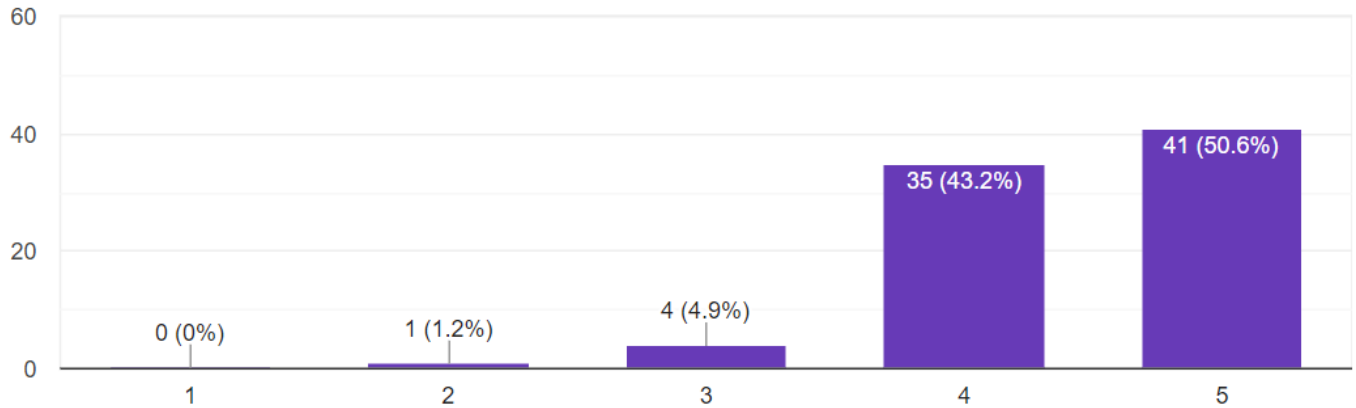


Figure 16 Responses of CAT tool users to the question: With 1 being poor and 5 being excellent, how would you rate your computer usage skills?

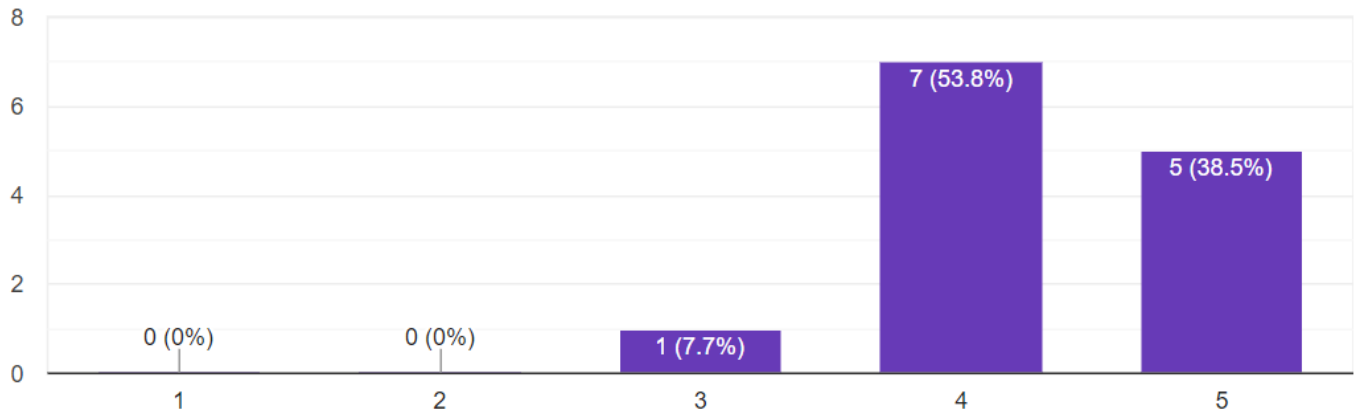


Figure 17 Responses of non-CAT tool users to the question: With 1 being poor and 5 being excellent, how would you rate your computer usage skills?

When the participants that do not use CAT tools were asked which CAT tools they have heard of, most (76.9%) reported hearing of SDL Trados, while other CAT tools were not as widely known to them, with memoQ (46.2%), Wordfast Pro (46.2%) and Memsource (38.5%) being among the slightly more well-known ones. 23.08% (N=3) reported not having heard of any CAT tools.

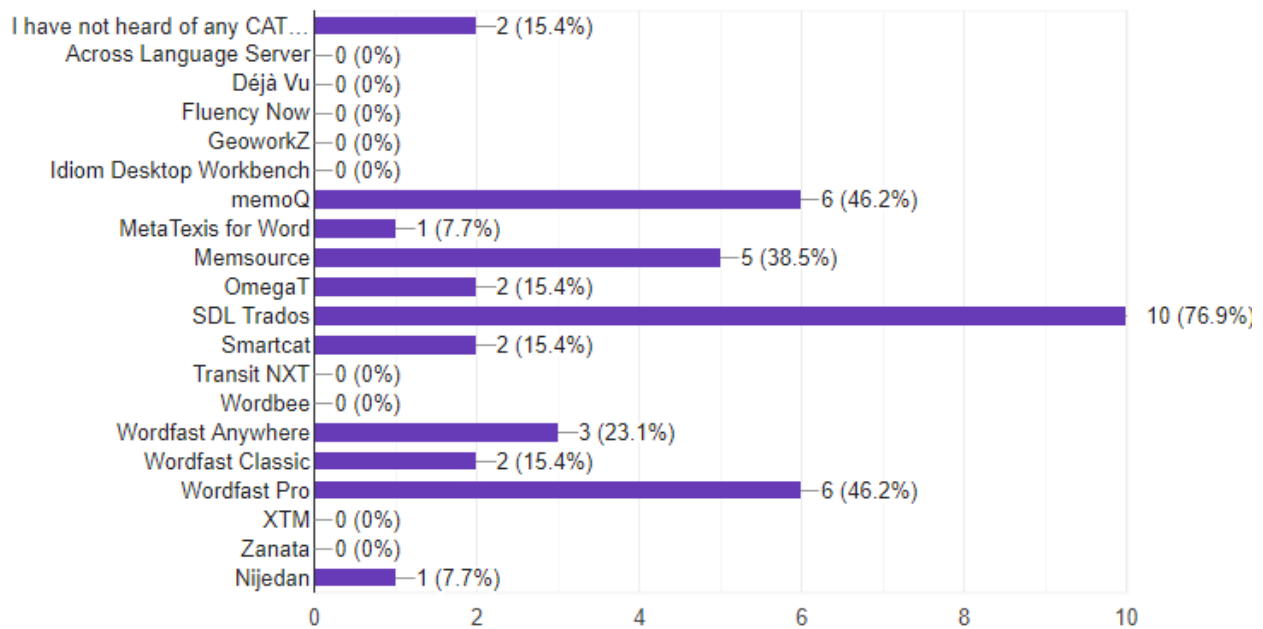


Figure 18 Responses to the question: Which, if any, of the below listed CAT tools have you heard of?

When the participants that do not use CAT tools were asked what their reasons for not using one were, the majority (69.2%) reported “lack of time needed to learn how CAT tools work” as a reason. The second-highest option (38.5%) was “unsuitable for the field in which I translate”, which would correlate with Figures 8 and 9, where the text types slightly differ between those TRLs that use CAT tools, and those that do not. The third-highest option (30.8%) was price. Considering that multiple options were selectable, this result again seems to imply that price is an

afterthought to TRLs when deciding on which, if any, CAT tool to choose. 15.4% reported difficulties in deciding which CAT tool to use, which is understandable, as the CAT market is relatively large with many tools to choose from. 15.4% also reported difficulties in learning how CAT tools work. One of the participants, who had tried using CAT tools in the past, was very critical of them, calling them “soulless tasks that suck the life out of TRLs”, further noting that CAT tools create tedious texts which are unpleasant to fine-tune afterwards. The participant did opine that there is a use for CAT tools when dealing with routine translations, but that, according to them, nuance is impossible to achieve using only CAT tools, as certain text types require a human element to translate correctly.

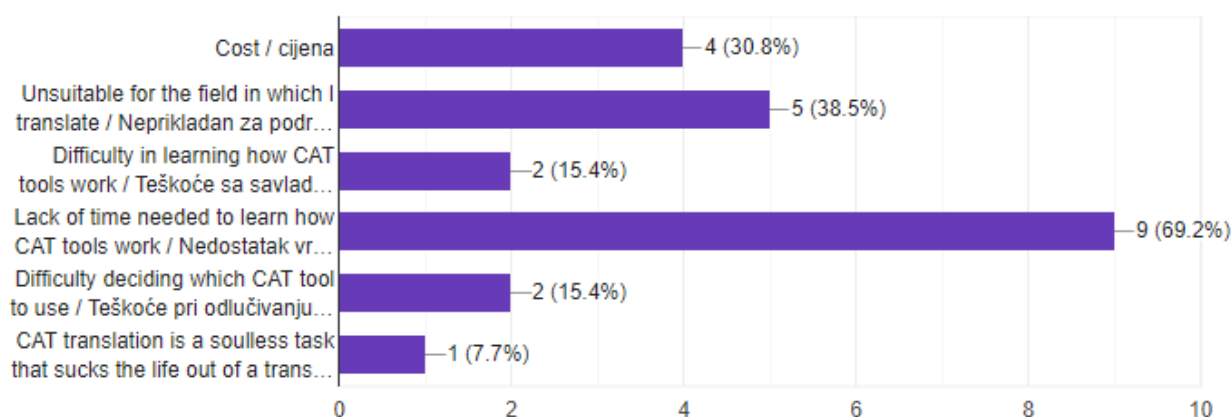


Figure 19 Responses to the question: What are your reasons for not using CAT tools when translating?

In the final section of the questionnaire, the participants were able to leave additional comments related to 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 participant stated that CAT tools keep improving, while also recommending the use of modern machine translation, based on neural MT technology, for Trados. Another participant made a similar

comment, stating that what makes CAT tools so effective is their integration with machine translation. Yet another participant suggested a study that examines how much TRLs use the machine translation options offered by many CAT tools (including Trados); this is something that could be examined in future studies. As mentioned previously during the study, one participant commented that CAT tools are a requirement for TRLs who work with foreign clients, while another participant lamented the fact that higher-education institutions in Croatia do not teach their students how to use CAT tools, as many clients and translation agencies require the TRL to use CAT tools. Several participants noted that one of the main strengths of CAT tools is not only the option to store terms once translated and save them for future use, but also their ability to help users to be consistent in terminology use across one or multiple translations. One noted that CAT tools not only create personal terminology bases for each user but are also capable of storing separate terminologies for each client, which enables users to have consistent translations for each client. Another participant stressed the importance of CAT tools for the creation, management and utilization of terminology. However, even though terminology bases and TMs make things faster and more efficient, one participant pointed out that creating a solid database is a time-consuming process, meaning that it will take a TRL many translations and many hours of work before they notice a significant increase in efficiency in their translation process.

4.2. Analysis of SDL Trados

Based on the results obtained from the questionnaire, the most used CAT tool by TRLs in Croatia is SDL Trados. Hence, in the second part of the study, an analysis of this tool is undertaken from the perspective of a TRL with no experience....

The first step of the analysis of SDL Trados was to install the tool. A trial version of SDL Trados Studio 2021 can be downloaded from the trados.com website. Once downloaded, the trial version can be installed by clicking on the downloaded file. The trial version can be used for 30 days, after which the full version must be purchased, to continue using Trados. The installation process of SDL Trados is quick, lasting around 3 minutes.

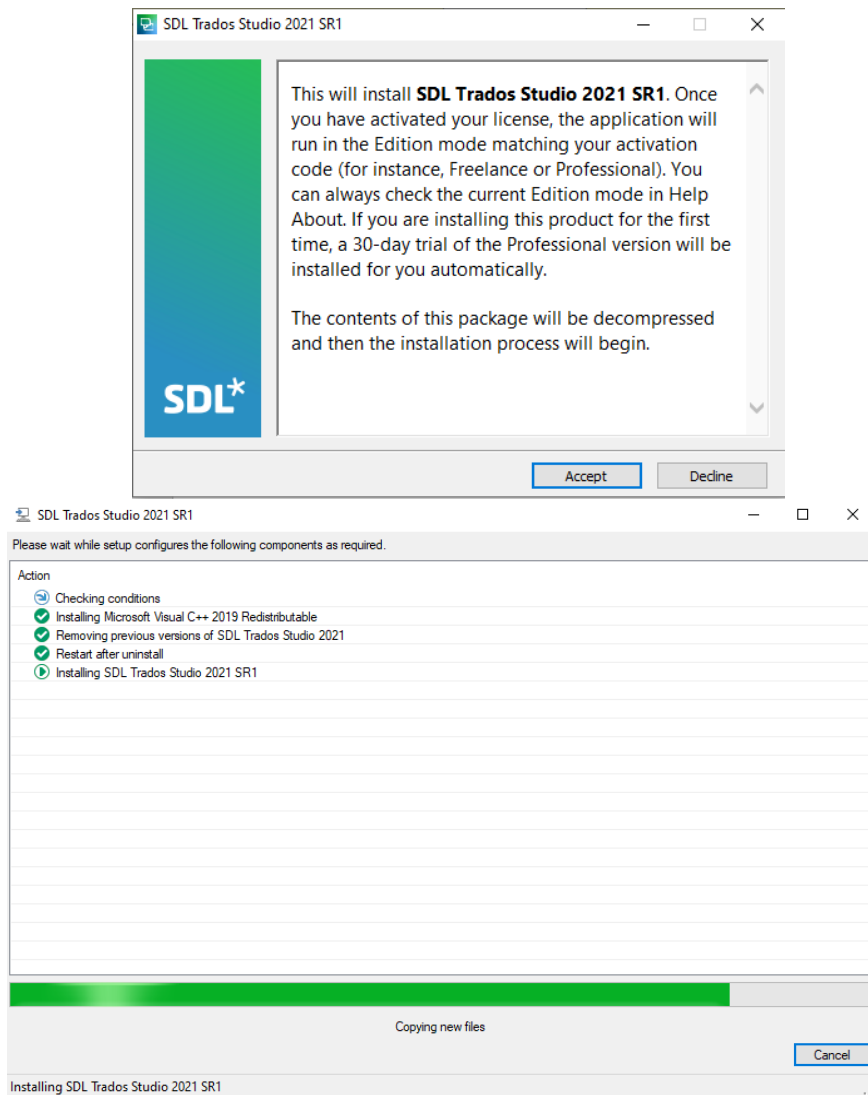


Figure 20 SDL Trados Studio 2021 Installation Screen

When Trados is first opened, there are a few more steps before users can start using it to translate. In the window titled *current user details*, it is necessary to input the user's name, e-mail address, as well as phone number (not required).

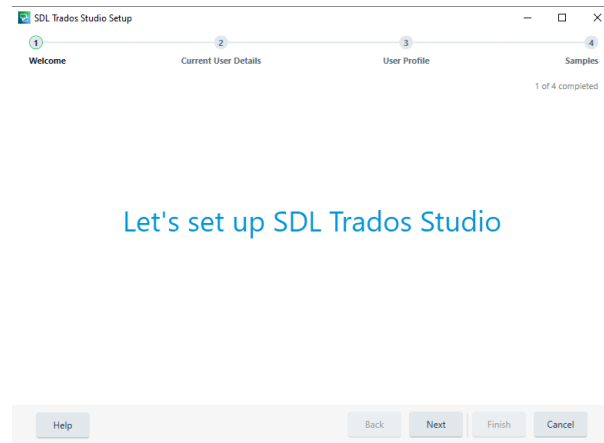


Figure 21 SDL Trados Studio 2021 Setup Screen #1

Under *user profile*, users can choose between *default* (recommended for new users), *SDL Trados* (recommended for SDL Trados users) and *SDLX* (recommended for SDLX users) profiles. As a new user, I chose to go with the default profile.

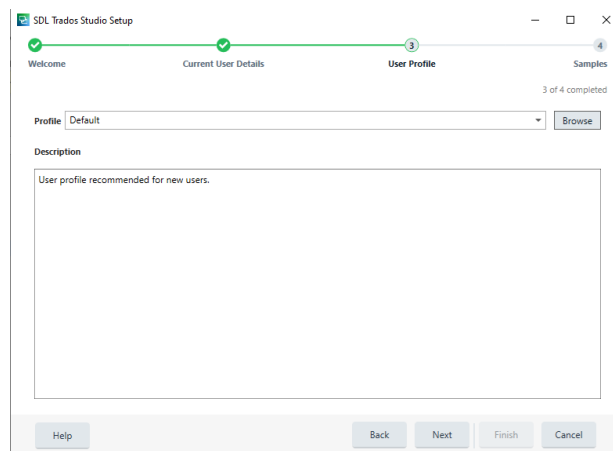


Figure 22 SDL Trados Studio 2021 Setup Screen #2

The final step consists of choosing whether the user wants Trados to load sample files at initial startup. Loading the files makes the startup slightly longer.

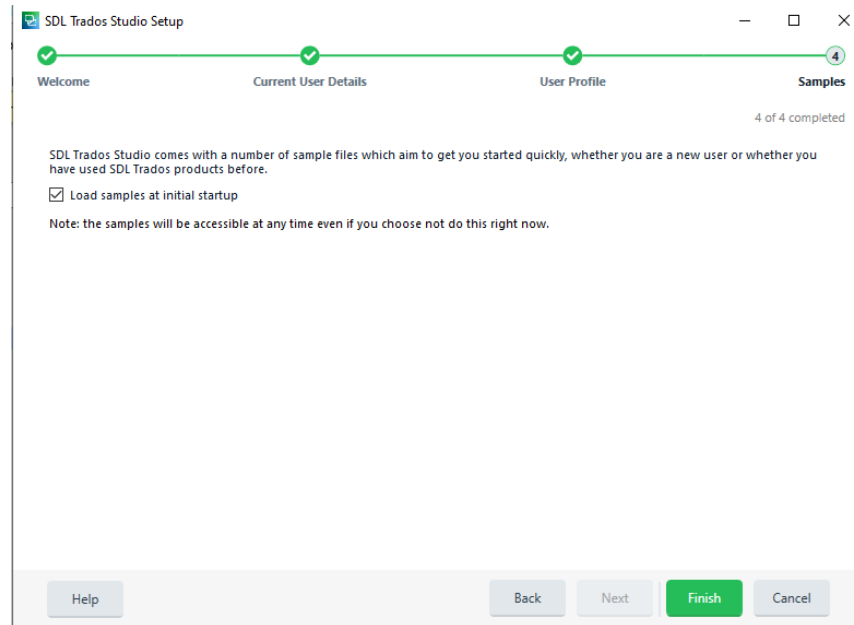


Figure 23 SDL Trados Studio 2021 Setup Screen #3

After clicking *finish*, the tool can be used. Trados usually takes 30-60 seconds to start and load all the features. When everything is loaded, the main interface appears. The main interface consists of a welcome screen, from which users can choose various options, depending on what they want to do. Some of the options are opening or choosing a file to translate, starting or opening a new project, opening an analyzer that details statistics about a certain translation, including the percentage of matched segments, or opening the editor, which is the main workplace where the TRL translates from the ST to the TT. There is also the option to open or create a new TM. The user interface (UI) is simple and intuitive to use and should not take users long to acclimatize to it. Of note is that Trados has the option of integrating with SDL MultiTerm, a separate application, to manage the user's terminology. The application comes free with a purchased Trados license,

but, as I am using a trial version, I was unable to use the terminology management feature. There is also a neural machine translation feature, but it requires a subscription. The additional services and subscriptions required for additional features are, in my opinion, one of the negatives of SDL Trados. On a positive note, although the sheer number of features may sound overwhelming at first, Trados makes it easy for users to learn about them, as it offers first-time users the option of watching a tutorial video to familiarize themselves with the tool and all the features. The video explains how to start a translation project, how to use its key translation features, how to finalize a project, and finally, an overview of the key UI areas of the newest version of Trados. There is also a *tell me what you want to do* search bar, which brings up relevant options when typing in key words. For example, typing in *machine translation* brings up *language cloud*.

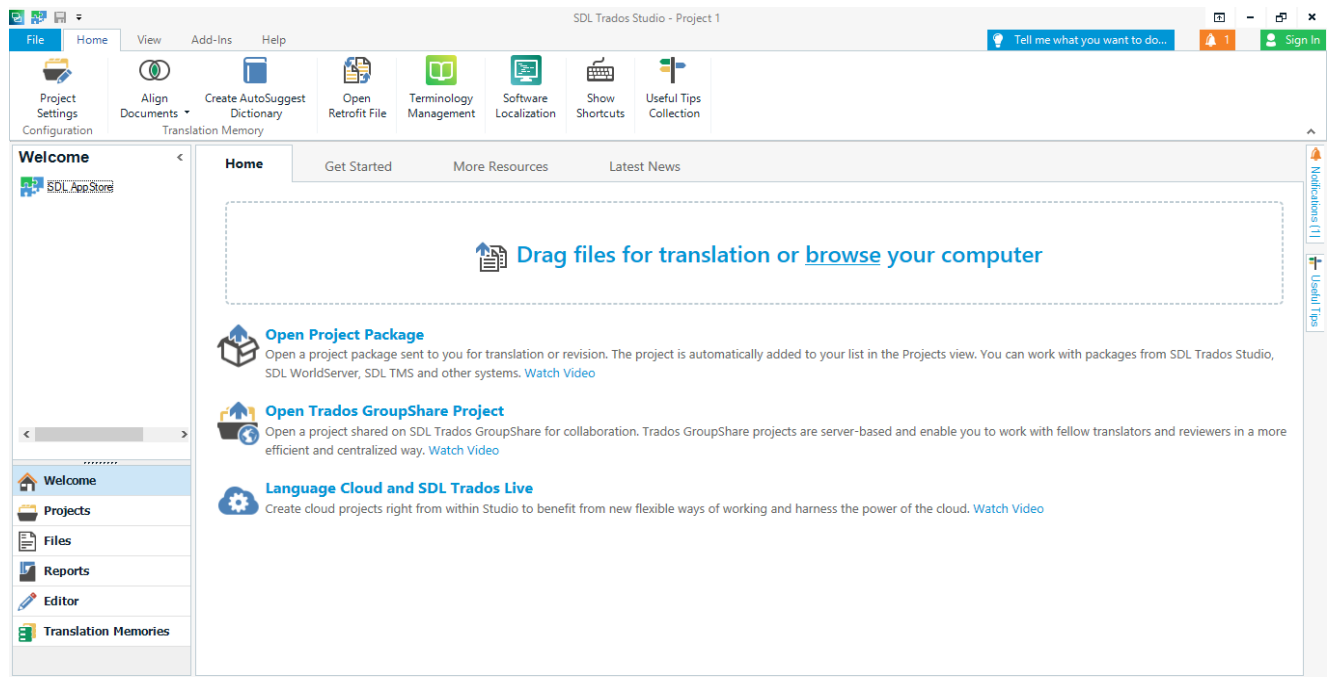


Figure 24 SDL Trados Studio 2021 Welcome Screen

To take advantage of the benefits that CAT tools provide, a TM is needed to make the translation process faster, offering suggestions for translation using previously memorized connected segments. However, a new user of SDL Trados will not have any databases ready. SDL Trados Studio 2021 allows users to import .sdlxliff and .sdlalign files. It is also possible to import and upgrade legacy TMs, with the use of a free app called *SDL Trados Compatibility and Migration Power Pack*, which can be accessed from the SDL App Store. The app will add an *Upgrade Translation Memories* option to SDL Trados. The default file type for Trados Studio 2021 TMs is .sdltm. New users can download TMs from the Internet, but these are usually of a lower quality and not specialized for the user. As I did not have any TMs, I created a new TM for the language pair Croatian-English. Using the option *Align Documents*, it is possible to align already translated documents and add them to the TM. Trados offers the option of aligning a single file pair or choosing multiple files. I decided to align several documents posted on the Republic of Croatia's Ministry of Science and Education's website which have official English translations. After selecting the source and target documents, the alignment editor opens with colored lines (Green, yellow and red) which connect segments which Trados has assumed should be paired up. Green lines indicate the highest degree of certainty, while red lines indicate lower degrees of certainty. Trados allows for the pairs to be checked before being imported to the TM; this needs to be done manually by the TRL.

Although Trados can import PDF files (including scanned PDFs), there are some problems with the feature, as while using the alignment option, I found that both ST and TT sometimes omitted words and even entire passages that were present in the original files (the PDF files I used were not scanned), for no apparent reasons. It is possible to fix this by simply editing a segment, but it makes the process more time-consuming, as the user must check the original file and type

out the words into the segment in Trados. To attempt to solve this problem, I copied both the STs and TTs into Word and saved them in the Word format, .docx. However, when copying from PDF to Word, some words also get omitted. It is worth noting that Trados automatically converts PDF source and target files into Word when they are selected for alignment. My next attempt consisted of converting the PDFs to Word using another tool, the adobe.com website, which offers free conversion from PDF to Word. However, even after the conversion, there remained many omitted words and words that were converted to images, which made it impossible for Trados to recognize them, meaning that making a TM out of those two PDF files would be a very tedious process. The solution to the problem is simple; users can open Microsoft Word and drag a PDF file into it, which the program automatically converts, with, from what I have seen, no omitted words or phrases. Therefore, it should be noted that Word's PDF conversion feature is much more consistent than SDL Trados', in my experience.

Preporuke za organizaciju rada u razrednoj nastavi i upute za vrednovanje i ocjenjivanje u mješovitom modelu nastave	1	1	Recommendations for organization of teaching for lower primary education and Guidelines for assessment and grading in combined teaching model
Preporuke za organizaciju rada u razrednoj nastavi i upute za vrednovanje i ocjenjivanje u mješovitom modelu nastave	2	2	Recommendations for organization of teaching for lower primary education and Guidelines for assessment and grading in combined teaching model (earliest deadline for implementation:
Preporuke za organizaciju rada u razrednoj nastavi i upute za vrednovanje i ocjenjivanje u mješovitom modelu nastave	3	3	11 May 2020)
Preporuke za organizaciju rada u razrednoj nastavi i upute za vrednovanje i ocjenjivanje u mješovitom modelu nastave	4	4	Ministry of Science and Education, 30 April 2020
Preporuke za organizaciju rada u razrednoj nastavi i upute za vrednovanje i ocjenjivanje u mješovitom modelu nastave	5	5	Contents
(najraniji rok primjene: 11. svibnja 2020.)	6	6	Introduction
Ministarstvo znanosti i obrazovanja, 30. travnja 2020.	7	7	In accordance with the Croatian Government Conclusion of 23 April 2020 it is planned to reopen the schools for lower primary education for specific groups of students in line with recommendation of Croatian Institute of Public Health (CIPH). Namely, with the economic recovery, it is expected that parents will not work from home anymore so in line with that it is necessary to re-establish specific functionalities of education system.
Sadržaj	8	8	
Uvod	9	9	
	10	10	

Figure 25 Alignment Feature in SDL Trados Studio 2021. Left: Source Text. Right: Target Text

As using the alignment feature in Trados is rather time-consuming, especially for longer documents with many segments, which all must be manually connected, I decided to analyze the

ST of the document that I want to translate, in order to find the most commonly used words and phrases, and then add those words and phrases into the TM. This can be done by adding a macro to Microsoft Word, to list the most common word occurrences. After finally having created my TM using the most frequent words from the document, I could finally start translating it.

To start a new translation project in SDL Trados, users can drag and drop a document into. The user will then be required to choose the TLs and SLs, as well as which TM they want to use. A new TM can be created, or users can choose an existing one.

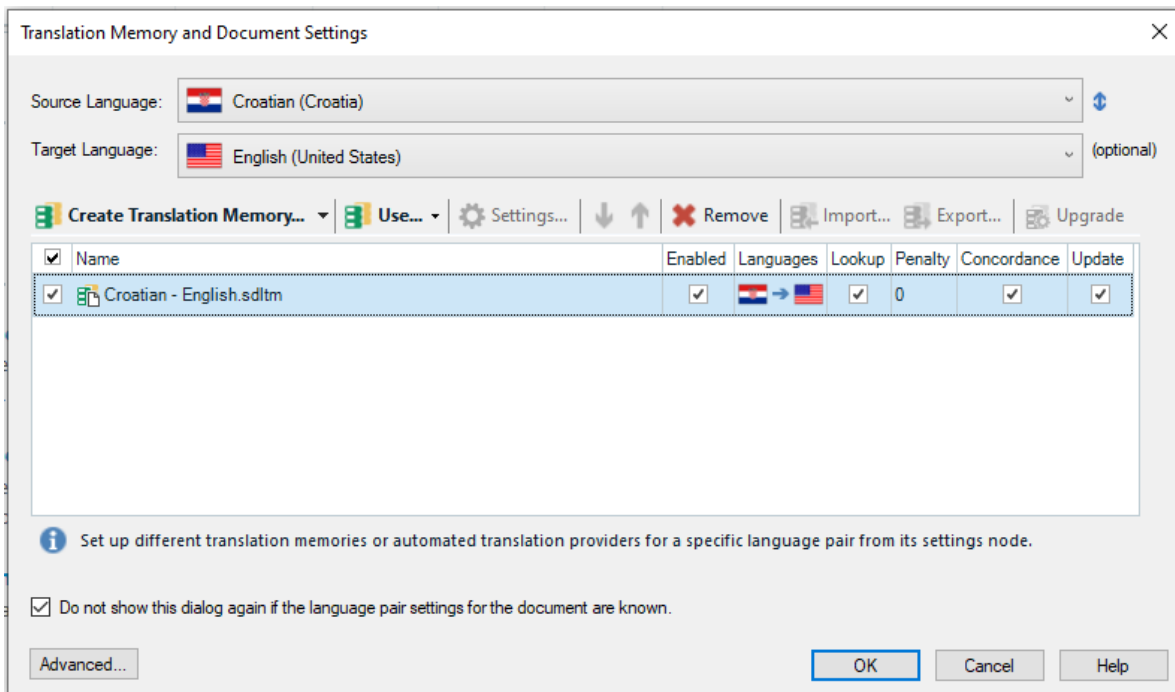


Figure 26 SDL Trados New Project Settings

After selecting the settings for the translation project, Trados will automatically open the editor, where on the left side, the ST is shown, while on the right side, the TT is shown.

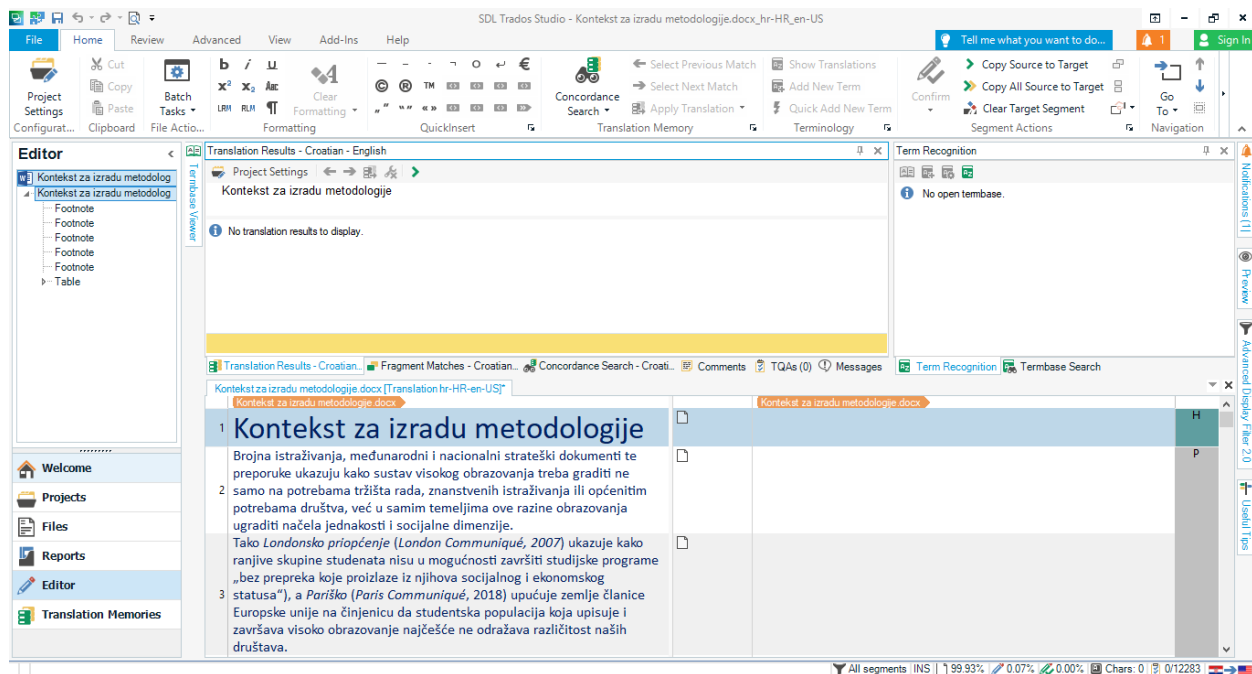


Figure 27 SDL Trados Editor Window

Unfortunately, as the TM I had created was not detailed or large enough, Trados did not show me any results in the TM. The reason for this is that I had only translated single words, while the TM usually divides segments into sentences. In this case, there was not a similar enough match for the TM to show any results. However, by using the option *concordance search*, the user can type a single word in the SL, and, if there is such a word in the TM, they will get a result. To test this, I typed out the word *studenti* in Croatian, which I had added into the TM earlier. Trados suggested the word *students*. When performing a concordance search, Trados displays the source language term on the left and its target translation term suggestion on the right. Next to the suggestion there is a percentage match, indicating the degree of match that exists between the entered search term and the segment in the TM. As I had aligned *studenti* – *students* and entered it into the TM, concordance search showed a 99% match between the two open terms. Trados also listed the pairs *studentima* – *students*, with an 87% match, and *studentata* – *students*, with an 86% match.

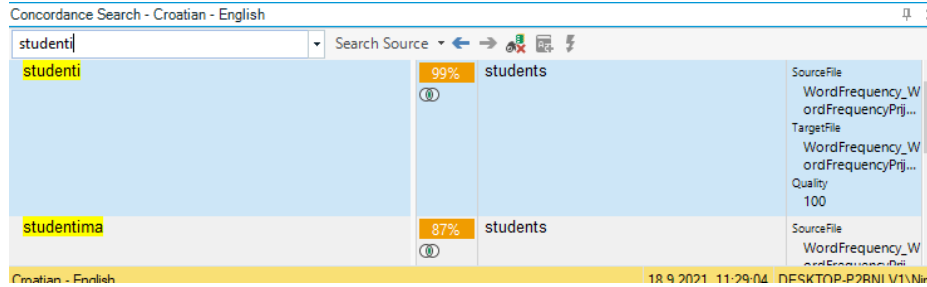


Figure 28 Concordance search for the word studenti in Trados

Another feature of Trados is the option to add or create a new termbase, which is done with Trados' *Termbase Wizard*, found under *Project settings*. The Wizard is capable of creating a selecting termbase definitions for a termbase, specifying a name for the termbase, adding language fields for the termbase languages (Trados has an exhaustive list of languages, including sublanguages), adding descriptive fields and specifying their properties, as well as defining the structure of entries in the termbase. After a termbase is created, users can add new terms into it by selecting a term from the ST, right clicking, and selecting *add new term*. Alternatively, if a term has already been translated, the translated term can be selected and added into the termbase in the same way.

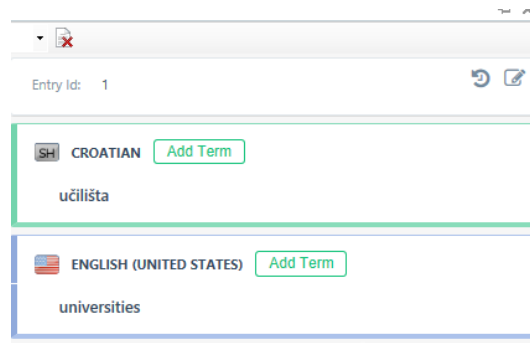


Figure 29 Adding the term učilišta to a termbase in Trados

The rest of the translation process, although without the help of a TM, went faster than it would have without using a CAT tool, as Trados's editor interface allows the user to simultaneously view both the ST and TT, thus if the user has only one screen, he/she does not have to switch from one window to another. Using the arrow keys on the keyboard allows the user to move between segments, making the process faster. Another time-saving feature is that Trados automatically modifies font types and styles in the TT according to the ST, meaning that the TRL does not have to manually switch them when, for example, translating a title and then translating the rest of the text. Nevertheless, the excerpt was quite time-consuming to translate, containing around 80 segments in total, with one segment typically taking 1-10 minutes to translate, depending on the size. The reason for some segments taking such a long time to translate is because of the use of some specific terminology, such as *labor market*, *intensification* etc. Having a built-up TM and a termbase could significantly shorten the translation time. As is, I estimate I was about 10% more efficient while using SDL Trados, although as noted, the efficiency should increase parallel with the growth of the database (terminology base and TM). It should also be noted that 10% is a subjective estimate. To make an objective estimate, other parameters that were not a part of this study should be included, such as measuring the exact time needed to translate a certain document etc.

After finishing a translation, users can go to *File* → *Save Target as* and save their translated document. It is worth noting that Trados has many more features that I, as a TRL inexperienced with CAT tools, did not use. I would say there is a slight, though not steep, learning curve associated with using Trados (and CAT tools in general). However, as users use Trados more and more and become more familiarized with it and its features, as well as build up their databases, the translation process should become more efficient.

To summarize the analysis of Trados, as a new user, I would conclude that the positives are the intuitive User Interface and the options offered that help new users learn about all the features and how to access them. As a negative, I would point out the problems I had trying to create a TM using the alignment feature, although this problem is simple to fix. Another disadvantage of SDL Trados is that many features that bring out the full potential of the tool are unavailable to trial users. However, as these features are available with the full purchase of SDL Trados, and the majority of TRLs do not consider price a big factor when deciding on which CAT tool to use, the benefits of SDL Trados outweigh the drawbacks.

5. Conclusion

Translation today is much more reliant on computers, as computer technology has rapidly grown in the last few decades. Computers can significantly facilitate the translation process.

Translation using computers can be divided into computer-assisted translation and machine translation. Both translation types serve different purposes. The potential today lies in integrating these two types of computer translation.

CAT tools, i.e. software that is used for computer-assisted translation, traces its roots to the 1960s, although CAT tools in their finalized form first appeared in the mid-1990s. The history of CAT tools can be divided into two eras, each with its own characteristics. They are the classic era, from 1995 to 2005, and the modern era, from 2005 to the present. The classic era was focused on stability and computing power, while modern CAT tools have shifted from those aspects and focus on using the Internet and cloud computing to make themselves accessible to a broader audience, as well as to provide the possibilities of integrating CAT and MT.

Many TRLs today (86.2% of participants surveyed in this study) use CAT tools, not only because they make the translation process more efficient, but also because many clients require TRLs to use CAT tools. In Croatia, this is especially common with foreign clients. The study conducted in this thesis has shown that the majority of freelance and in-house TRLs in Croatia use CAT tools. It has also confirmed that the majority of those TRLs have largely positive opinions on CAT tools and consider them to be helpful when translating. The most used CAT tool among TRLs in Croatia is SDL Trados, although Memsource also has a significant share of the market and has increased it quickly, which in part may be due to its focus on cloud computing.

When it comes to how much CAT tools increase the efficiency of a translation, it is understandable that the opinions of TRLs are varied. Most of this comes down to just how extensive a user's database (consisting of their termbases and TMs) is. For a new user, who is starting out with a clean database, translations using CAT tools will not be significantly faster compared to not using a CAT tool, although CAT tools, such as SDL Trados, provide an interface, such as using a split screen for STs and TTs, which facilitates the translation process. One of the limitations of this study was that it was not able to objectively measure exactly how much a TRL's efficiency is increased, and instead relied on the subjective reports of the participants.

Several participants mentioned that what makes CAT tools especially efficient is their integration with MT, mentioning they would like to know just how many TRLs take advantage of the MT option offered in many CAT tools. This is something that should be examined in a future study.

As this study has confirmed, the main drawback, if it could be called that, for CAT tools, is that in order to achieve their fullest potential, a user will need to have many translations already performed and stored into a TM, meaning that their full potential cannot be realized from the start. Nevertheless, CAT tools are very helpful for TRLs and have become a necessity nowadays, and their full potential has still not been reached. As technology continues to develop, so will CAT tools, and they should become even better in the coming years.

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