Legal Machine Translation Explained

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MT in Legal Contexts

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ABSTRACT

Machine translation (MT) has made huge strides forward in the last decades. In the legal field, however, there are only a few academic works dedicated to exploring how MT can be successfully applied in legal translation practice. There is currently a gap in the literature that concerns studies on the automated translation of legal documents drawn up by international law firms and/or tackled by legal translators. This book is aimed at bridging this gap by providing an in-depth analysis of MT in legal practice. It explores whether and to what extent MT can be considered reliable or, at least, acceptable in the legal field and in legal practice. It investigates whether MT target texts can be used as drafts to be further processed (i.e., post-edited), and how it is possible to tackle MT shortcomings and supplement MT tools with other language resources.

By following a practical approach, this book reports and discusses the findings of surveys carried out with professional legal translators and international law firms. It analyses authentic machine-translated documents issued or used by international lawyers and ways to cope with MT issues, as well as translation practice observation studies undertaken with professional legal translators. The findings of this book highlight the successful integration of a variety of digital resources, amongst which the most effective ones are corpora and targeted web searches. It is necessary, however, that users develop digital skills, such as corpus consultation, and are acquainted with the system-specificity peculiarities of the language of the law.

INTRODUCTION

Machine translation (MT) has made huge strides forward in the last decades, and the literature has dedicated a great deal of research to explore its features, improvements and applications in various fields. In particular, scholars have focused on investigating MT shortcomings in different language pairs. The importance of error prevention and recognition, as well as of quality assessment and evaluation, or pre-editing and post-editing, have long been addressed by the literature. Also, new algorithms and more effective applications of MT have been analysed in depth. There have also been a number of studies highlighting possible MT misuses and the related risks for end-users. Over the years, it is apparent that the literature have leaned on bringing to the fore MT errors, ways to tackle them, and possible usages of MT in the translation training classroom. By contrast, little has been investigated as concerns MT end-users, and the practical aspects of MT in the work environment and, hence, in translation practice.

With regard to the legal field, there are only a few academic works dedicated to exploring how MT can be successfully applied in legal translation practice and in the legal profession. Therefore, there is currently a gap in the literature that concerns studies on the automated translation of legal documents drawn up by international law firms and/or tackled by legal translators. The majority of the works concerned with legal MT currently focus on translation training and court-related documents, such as writs or judgements. Alternatively, they address the risks of misusing MT in trials in the lawyer-client relationship. Little has been investigated as concerns recurrent legal documents such as contracts and agreements, formal notices or letters, and sector-based articles published by lawyers. No academic work has particularly dealt with the linguistic pitfalls of MT in the legal profession and the ways they are tackled in legal practice. No survey has been carried out to explore lawyers and professional translators' approach to legal MT; how often they resort to it and why, as well as how they try to compensate for its shortcomings.

This book is aimed at bridging these gaps by providing in-depth analyses of MT in legal practice. Hence, the research questions that this book aims to address are the following: 1) Can MT be considered reliable

or, at least, acceptable in the legal field and, in particular, in legal practice? 2) Can MT target texts be considered as drafts to be further processed (i.e., post-edited) in legal translation practice? 3) If this is possible, how can MT shortcomings or inaccuracies be compensated for? 4) Which are the tools that can supplement or integrate MT in the legal field? 5) How often and to what extent do lawyers and legal translators resort to MT? Which platforms do they use? 6) Which other language tools do they use, or which other professionals do they engage to perform post-editing and/or compensate for MT issues?

Given the above questions, it is clear that this book is aimed at exploring whether and to what extent legal machine translation can be a feasible language resource in translation practice and, if so, which precautions or strategies should be adopted in order to produce qualitatively reliable target texts.

To answer the questions, the present book investigates the quality of MT by focusing on authentic legal documents, and explores ways to compensate for legal and/or language shortcomings, if any. Linguistic issues are addressed by using a variety of digital resources, such as monolingual and bilingual dictionaries, experts' forums, legal corpora and the web as corpus via advanced targeted searches. Legal shortcomings are compensated for by consulting the case-law and system-specific statutes or statutory documents.

This volume is divided into three parts. Part I introduces the general features of MT applied to several fields of study and traces the history and evolution of Machine Translation from its first inception. Part II focuses on MT in the legal field an describes the related legal and linguistic challenges that need addressing. Part III is dedicated to surveys and case studies concerning the use of MT by lawyers and professional legal translators; hence, it brings to the fore applications of MT in legal translation practice.

Part I is divided into three chapters. Chapter 1 traces the history of machine translation by describing the uses, advantages and disadvantages of the different types of MT, such as rule-based, statistical and neural. It then discusses the current strengths and weaknesses of MT in the translation of technical texts. It focuses on the precautions that users should take when dealing with MT and the importance of MT literacy in order to reduce the risks of a low-quality output. The relevance of the language pair is also tackled, as the literature reports varied results across different language combinations. The first chapter ends by suggesting techniques to improve MT effectively, such as pre-editing and post-editing processes, and how these methodologies have changed and evolved over time.

Chapter 2 discusses MT quality estimation, quality assessment and error detection. In particular, it highlights the methods suggested and followed by scholars, which mainly revolve around automatic and human-based strategies. The chapter deals with the advantages and disadvantages of each methodology by providing insights into the most recent findings. Strictly connected with quality assessment is error classification and detection, which can also be performed automatically or by humans. The chapter explores the differences in this regard and highlights the related risks and benefits, as well as the latest developments in scholars' research.

Chapter 3 addresses the different focus that the literature has put on MT in translation training and practice. In particular, it argues that many avenues of research have been explored to describe the uses, applications and benefits of MT in the translation training classroom. For example, a large number of academic papers uncover aspects such as MT errors, shortcomings and post-editing techniques experimented with students in academic settings. By contrast, the chapter claims that researchers have carried out fewer investigations as concerns MT in translation practice. Their analyses, in fact, range from studies in the medical field (with a particular focus on the practitioner-patient relationship) or language signs. Apparently, the scientific community is lacking contributions in the field of MT applied to translation practice. The chapter ends by positing that this could be due to the consistent amount of work deriving from investigating professionals' or translators' work practices, as well as confidentiality issues. The first part of the book ends with Chapter 3.

Part II is concerned with legal MT and is composed of Chapter 4, 5, 6, 7 and 8. Chapter 4 presents the most frequent applications of MT in the legal profession, such as in the pre-trial phase, in criminal proceedings and in patent applications. The chapter also outlines other digital tools that are used in legal translation practice and in the legal profession, such as intersemiotic legal translation and the transmission of e-documents with legal relevance.

Chapter 5 further explores some digital tools that can be used in legal translation practice. To this aim, it focuses on corpora and the web as corpus as supplementary language tools. It starts with an introduction to (general) corpora by describing their characteristics and advantageous uses in translation training and practice. It then addresses legal corpora and their attested usages in legal translation. The chapter ends with a description of the web as corpus for translation purposes, and the ways to carry out advanced Internet searches mindfully and effectively.

Chapter 6 tackles the (legal) challenges of (legal) MT. It starts with an introduction to the legal challenges that users are confronted with, if they

approach MT too naively or recklessly. Hence, it uncovers issues such as malpractice suits against lawyers who neglected their clients' privacy, and copyright infringement cases. The chapter also describes the challenges that lawyers meet daily, such as the risk of losing their jobs due to increasing performances of MT tools (and, more in general, of artificial intelligence, AI). The chapter ends with addressing the legal challenges of legal MT. In particular, it focuses on possible misuses of MT in legal proceedings and in court, or during police searches. It brings to the fore possible violations of human rights, as well as the risk of having court documents declared inadmissible due to improper uses of MT.

If Chapter 6 revolves around the (legal) challenges of (legal) MT, Chapter 7 deals with the linguistic challenges of the language of the law, and, hence, of legal MT. To do so, it starts with a description of the peculiarities of legal language, and the reasons why it is considered archaic and intricate. While listing the characteristics of *legalese* that affect the translation process, the chapter clarifies why legal MT is demanding. In the legal field, in fact, target texts must conform to both linguistic conventions and system-bound principles, which make MT processes particularly complex. For these reasons, the chapter ends by posing the highly disputed question as to whether legal translators should only be lawyers, and if legal English as a *lingua franca* (LELF) should be resorted to when no equivalences are found, and to what extent.

Chapter 8 traces the latest developments in MT applied in legal translation training and practice. In this respect, it discusses the different extents to which academic research has covered and investigated both aspects. As regards MT in legal translation training, the chapter comments the latest research findings, with a particular focus on error detection and correction. It also unveils different pedagogical approaches to training students in legal MT, and how it is possible to raise their awareness and literacy. In this regard, pre-editing and post-editing techniques are accounted for. As concerns MT in legal translation practice, the chapter argues that this field of research has not been addressed extensively. To confirm this claim, it presents the few academic works that focus on the automated translation of legal texts in legal translation practice. The chapter also discusses recurrent shortcomings encountered by practitioners and scholars in legal MT and how they suggest compensating for them. Part II ends with Chapter 8.

Part III is dedicated to practical aspects and applications of MT in legal translation practice and in the legal profession. It comprises Chapter 9, 10, 11 and 12. Chapter 9 reports the results of a survey carried out with professional translators based in Italy. It comments on how they perceive

and use MT in the legal field. The chapter sheds light on the translators' habitual MT tools and how they integrate them with other language resources, as well as how they assure MT quality. Also, it provides insights into the translators' perceptions of the advantages and disadvantages of MT in the legal sector.

Chapter 10 describes case studies carried out with professional legal translators. The chapter is aimed at exploring whether *ad hoc* legal corpora and the web as corpus can be consulted effectively to post-edit legal texts translated automatically into a second language. For these purposes, the chapter focuses on an observation study undertaken with two groups of professional legal translators, all working with the Italian-English language pairs in both directions. The relevance of this study lies in its cross-based analyses, since the two groups of participants post-edited the same machine-translated clauses, but with different tools. In particular, the first group post-edited an automatically translated clause by using their habitual language resources, whereas the second group performed corpus-based post-editing on the same translated clause. In this way, it has been possible to ascertain whether the consultation of an *ad hoc* corpus and of the web as corpus improve MT output and, more in general, translation performances, as well as legal language awareness.

Chapter 11 discusses the results of a survey undertaken with international law firms based in Italy. The chapter describes how and how often legal practitioners use MT in their daily routines; the perceived risks and benefits; how post-editing is performed, as well as MT possible future scenarios. The chapter also brings to the fore the types of MT tools used by international lawyers and how they generally compensate for MT shortcomings.

Chapter 12 focuses on the machine translation of legal documents produced and used by lawyers in their daily activities. The chapter presents, discusses and analyses documents of various genres (source texts) that were provided by international law firms based in Italy. For the purposes of the chapter, the texts are translated automatically by using different types of MT platforms and are then post-edited with the help of a variety of digital tools. The chapter investigates whether the automated translations of authentic (Italian) legal texts can be considered as drafts and, if so, which reliable language resources can integrate MT. In doing so, it highlights possible post-editing strategies and techniques. The language tools that the chapter resorts to are monolingual and bilingual dictionaries, online and offline legal corpora, European parallel corpora, contract databases, the English and American case-law, and experts' forums.

As mentioned above, this book is aimed at bridging the current gap in the literature by providing instances and applications of MT in legal translation practice, and by discussing how end-users perceive and apply MT in their profession. To do so, it puts a particular focus on the English and Italian language combination. It is hoped that other avenues of research will follow this initial study and that this book will lay the foundations for investigations into other language pairs and/or domains.

PART I:

MACHINE TRANSLATION: AN INTRODUCTION

This part of the book deals with an overview of machine translation (MT), its benefits and risks, its developments since its first inception, as well as its applications in translation training and practice.

Chapter 1 firstly traces the history of MT and describes how it has been developed over the years. It then deals with the most relevant advantages and disadvantages of MT, and how to cope with them. The first chapter also focuses on the importance of MT literacy and the ways it can be improved via pre-editing and post-editing techniques.

Chapter 2 addresses the latest advancements in automated and human MT quality estimation and assessment, as well as MT error detection and correction.

Chapter 3 discusses the latest MT developments in translation training and practice. In particular, it brings to the fore literature findings in both fields of study.

CHAPTER ONE

MACHINE TRANSLATION

Machine Translation (MT) is concerned with the automatic translation of a source text into a target text without human intervention (Mulé and Johnson 2010, 32). MT is a computer-driven process where translations from a language into another are performed automatically.

The inception of MT dates back to 1949, when Warren Weaver, a researcher at the Rockefeller Foundation, presented his vision of computer-assisted translation to address the "multiplicity of language" that "impedes cultural interchange between the peoples of the earth" (Weaver 1955, 15). His aim and purpose were to enhance international understanding (Raley 2003, 291).

In Europe, MT was firstly applied in the late 1970s, when the European Community assigned the translation of documents into the Member States' languages to a company named Systran (Ketzan 2007, 210).

1.1 Types of MT

Until the 1970s, MT was mainly rule-based. According to this method, complex algorithms relied on linguistic rules and bilingual dictionaries. The system processed algorithms that operated at different levels: there were rules for dividing sentences into words; rules for searching for words in a dictionary; rules for carrying out syntactical analysis and transfer, and rules for writing a text in the target language (Melby 2020, 485). Rule-based MT developed three approaches: direct translation; transfer-based translation and interlingua-based translation (Hutchins 1955, 431-435; Arnold et al. 1994; Ketzan 2007, 212). With direct translation, MT systems worked with one language pair at a time and proposed a word-to-word rendering. With the interlingua approach, the source text was firstly translated into an abstract or universal language (i.e., an interlingua), then it was converted to any other language. With the transfer-based approach, syntactic and morphological analyses were carried out to simulate the meaning of the source language and produce a representation of it in the

target language. In practice, according to the rule-based system, MT generated target texts on the basis of advanced linguistic rules and dictionaries (Hutchins 2015).

One of the major drawbacks of rule-based MT was its lengthy construction process and the large number of linguistic resources applied (Costa-Jussá et al. 2012, 249). Creating a rule-based MT system required substantial linguistic efforts and human knowledge (ibid., 251).

Since the 1980s, another type of MT has developed; namely, statistical machine translation (SMT) (Brown et al. 1990; Koehn et al. 2003; Koehn 2009). With this method, statistical and probabilistical analyses are applied to source texts (Ketzan 2007, 212) to disambiguate terms (Arnold et al. 1994). With SMT, natural language translation is a learning issue (Lopez 2008, 1), and translations are processed by sourcing samples of authentic (i.e., human-made) target texts (ibid.). In particular, SMT systems carry out translations by relying on corpora composed of ready-made target texts (Sycz-Opoń 2014, 84). This means that SMT tools search for correspondences between source texts and target texts in parallel corpora (Nießen and Ney 2004, 181). Each word or phrase of the target language is assigned a certain probability, and the highest probability is assumed to generate the best rendering (Brown et al. 1990). Hence, the most probable translation of a word (or an entire phrase) is chosen on the basis of its statistical weight (Costa-Jussá et al. 2012, 249). Despite the strides forward made by SMT, this method is argued to fail if source text genres or styles are different from those of the reference corpora (Wahler 2018, 120-121). Building an effective SMT system, in fact, requires the availability of parallel texts, as well as specific software, such as aligners and translation unit extractors (Costa-Jussá et al. 2012, 252). However, differently from rule-based systems, statistical approaches do not require linguistic efforts, as they rely on sentence-aligned parallel texts (Costa-Jussá et al. 2012, 249).

Neural machine translation (NMT) (Kalchbrenner and Blunsom, 2013; Kyunghyun et al., 2014; Sutskever et al., 2014) has developed since 2014 and has apparently superseded the other forms of MTs (Castilho et al. 2017; Dabre et al. 2017). NMT builds and accesses a neural network of encoders and decoders, where the first ones cipher a source phrase and transforms it into a vector so that the latter produce a target phrase (Bahdanau et al. 2015). In this way, NMT generates fluent and idiomatic translations (Nunes Vieira et al. 2021, 1516) and the results are maximized (Bahdanau et al. 2015). NMT has increased the fluency, adequacy and accuracy of target texts. This is confirmed in analyses of academic papers addressing MT from 2015 to 2019 (Ragni and Nunes Vieira 2022, 142). Thanks to its innovative approach, NMT has reached outstanding

performances in several language pairs (Junczys-Dowmunt et al. 2016). Based on its attested better results, it is claimed that NMT will be the ultimate and final paradigm of MT (Melby 2020, 430). It is argued, in fact, that in the current MT scenario, NMT is largely preferred over SMT (Rivera-Trigueros 2022, 612). Also, NMT is reported to perform outstandingly on reordering, inflectional morphology and even in long-distance agreement (Ragni and Nunes Vieira 2022, 143).

Despite its innovative approach and improved fluency standards, the literature has also addressed the drawbacks of NMT. For example, scholars claim that it is not always reliable, as it tends to be less accurate than SMT (Castilho et al. 2017, 109; Nunes Vieira et al. 2021, 1516). In their study, in fact, Vigier Moreno and Pérez-Macías (2022) posit that NMT systems score well as far as fluency and style are concerned, whereas they are problematic as regards terminology and accuracy. On the basis of human MT evaluation, Castilho et al. (2017) report that the quality of SMT has not been reached yet (Castilho et al. 2017, 118), as NMT generates more omissions, mistranslations and, hence, post-editing work (ibid.). For some scholars, NMT output is even unpredictable (Melby 2020, 430-432). Many researchers corroborate these claims by asserting that NMT generates "noise"; namely, "natural noise" and "synthetic noise" (Belinkov and Bisk 2018, 4-5) that only human translators are able to detect. Natural noise is concerned with typos and misspellings, whereas synthetic noise mostly originates from swaps, e.g., swapping letters in a word due to fast typing (ibid.). Also, NMT does not seem to produce exact translations of long sentences or of rare words (Ragni and Nunes Vieira 2022, 143), and it tends to mistranslate words that are ambiguous or whose meaning should be analysed in context (Popescu-Bellis 2019).

In this respect, research findings show that phrase-based statistical machine translation (PBSMT) performs better in the conveyance of source-language meanings, although NMT apparently produces more fluent target texts (Nunes Vieira 2020, 325). The fact that NMT generates "fluent" texts is actually perceived as a disadvantage by some scholars, given that errors are more difficult to detect (Nunes Vieira 2020, 326), especially by students (Ragni and Nunes Vieira 2022, 142-143). Dik (2020), for example, warns against using MT "unawaringly"; some texts may appear well translated simply because they "read well" (ibid., 50). This is corroborated by Ragni and Nunes Vieira (2022), who suggest that translators should be trained to identify NMT errors to avoid the risk of producing incorrectly post-edited target texts (ibid., 143). For these reasons, researchers often use mixed MT systems, such as NMT and PBSMT, in order to compensate for the shortcomings of the different MT

tools (Álvarez et al. 2021; Ragni and Nunes Vieira 2022, 144).

1.1.1 MT interfaces

With regard to the various types of MT tools and MT architectures, Google Translate (NMT) is argued to be the most popular (Rivera-Trigueros 2022, 612), as it performs better than any other MT system. This is confirmed by Nunes Vieira et al. (2021), who focus their study on the application and consequences of the use of MT in medical and legal settings (Nunes Vieira et al. 2021, 1516). There are also studies focusing on other MT interfaces, such as DeepL or Microsoft Translator Hub (both platforms use NMT), Yandex (a system relying on SMT), etc. (see, for example, Volkart et al. 2018; Anany 2020; Cambedda et al. 2021; Diab 2021; Takakusagi et al. 2021; Vigier Moreno and Pérez-Macías 2022). In these cases, scholars analyse and bring to the fore the characteristics and performances of the MT tool(s) focused on. For example, Cambedda et al. (2021) find that DeepL (NMT) is more satisfactory than Yandex (SMT) in the Russian and Italian language combination, although the latter is more accurate with cultural-specific words. As far as Spanish and English are concerned, Hidalgo Tenero (2020) explores DeepL and Google Translator performances in the translation of idiomatic expressions. He finds that MT outcomes actually depend on whether the idioms are used in a continuous or discontinuous form in the sentence. Also, Volkart et al. (2018) carry out a comparative analysis of DeepL and Microsoft MT output in the translation (from German to French) of the Swiss's Post service materials. In their findings, they report that DeepL target texts are qualitatively better in view of the reduced post-editing time and fewer corrections they need. Wiesmann (2019) focuses on the automated translation (from Italian into German) of legal texts by using DeepL and MateCat. She posits that both MT platforms give way to too many inaccuracies. For this reason, she warns against any use of MT in translation pedagogy. Finally, Bestgen (2022) provides insights into the automatic translation of three MT platforms: Google Translate, DeepL and Microsoft MT. To do so, he compares MT output with the texts of the Europarl Parliamentary proceedings corpus. The findings reveal that Google Translate produces fewer collocational bigrams, suggesting a less effective translation performance.

1.2 Advantages and disadvantages of MT

Despite the numerous advancements made by MT technology (be it rule-based, statistical or numeral), automated translation is still argued to present flaws to such an extent that it requires human intervention to ensure translation quality (Chan 2018). For example, Mulé and Johnson (2010) posit that MT neglects context and, hence, meaning in context (ibid., 32). They state that MT systems such as Google Translate search for similar already-translated phrases without considering real meanings or similarities of meanings (ibid., 35). Also, Sycz-Opoń (2014) reports the numerous efforts made by translators to post-edit machine-translated texts, and the time dedicated to correct MT errors (ibid., 83-85). Nunes Vieira et al. (2021) inform about the various misuse that MT may entail, especially in public services such as healthcare and law.

On the other hand, the literature addresses the many advantages of MT in various settings. Some researchers, for example, argue that MT needs not be perfect, but simply viable to become "a truly useful tool for everyday online users" (Ketzan 2007, 214). In the medical field, MT can improve the patient-physician communication flow (Randhawa et al. 2013, 382), although this particular aspect could be challenged by confidentiality issues and a certain disregard for the complexities of languages (Kenny 2019; Nunes Vieira et al. 2021, 1525). In the legal field, especially in court-related matters, MT helps translate faster and cope with an increasingly demanding sector (Vigier Moreno and Pérez-Macías 2022). Also, minority language speakers can better access world-wide data and/or information in specific areas, such as consumer protection (Ketzan 2007, 221). Nonetheless, not all scholars agree on the above acclaimed benefits. Nunes Vieira et al. (2021), for example, state that MT research is mostly focused on a limited number of languages. This claim is corroborated by Hutchins (2015). The fact that MT studies are mainly dedicated to explore the most common languages may exacerbate inequalities and increase the disadvantages of the speakers of less widespread languages (Nunes Vieira et al. 2021, 1528).

Other studies focus on both the advantages and disadvantages of MT, and highlight the importance of offsetting MT benefits and risks. Mulé and Johnson (2010), for example, suggest balancing the need for a fast translation against the importance of accuracy (ibid., 34). They also highlight how the size of the target group and/or the reputation of the translation agency should not be underestimated, as the larger the number of readers (and/or the more popular the translation agency), the more accurate the target texts must be (ibid.). However, the most important factor is generally argued to

lie in the translators' acquaintance with the MT system and their awareness of its risks and drawbacks (Mulé and Johnson 2010, 34-35; Nitzke et al. 2019; Nunes Vieira et al. 2021).

1.3 MT in technical translation

MT is a field of study that continuously evolves, and the investigation and improvement of its algorithms or principles have continued since its first inception (Castilho et al. 2017; Wahler 2018; Nunes Vieira et al. 2021). For this reason, scholars continuously explore and propose ways to use MT almost risk-freely. For instance, it is well known that creative texts, artistic pieces and literary works cannot be translated by MT. The amount of creativity and subjectivity involved in these cases is too high, so that every phrase or sentence should be re-worded (Ketzan 2007, 224; Nitzke 2019, 243).

By contrast, MT works quite well in specialised translations, provided that some precautions are taken. Mulé and Johnson (2010) posit that MT performs better if sentences are short, grammatical constructions are simple, and ambiguity is avoided, as well as abbreviations, acronyms and contractions (ibid., 33-34; see also Mileto 2019). It can be easily predicted, in fact, that the simpler the syntax of the source text, the better the target phrases (Sycz-Opoń 2014; Mileto 2019). For example, the typical recurrence of compound sentences and unclear subjects in technical texts tend to produce mismatches (Takakusagi et al. 2021). Also, long and complex sentences with varied vocabulary pose challenges to MT (Kit and Wong 2008; Nunes Vieira 2020, 323). However, it is argued that revising target texts in these cases would not be particularly arduous or time-consuming (Aziz et al. 2014). Koehn (2020), for example, posits that NMT is particularly effective with large amounts of data and low-frequency words. This, however, is subject- and genre-dependant. According to Sycz-Opoń (2014), in fact, MT quality heavily relies on text type (ibid., 83).

1.3.1 Language pairs and MT output

MT performance is influenced by language pairs; in particular, by the similarity and popularity of the languages considered (ibid., 85). According to Hutchins (2015), the most frequent language pairs (hence, the ones that produce the most accurate MT output) are English-Spanish and English-Japanese, followed by English-French, English-German and English-Italian in no specific order (ibid., 133). For example, Takakusagi

et al. (2021) find that the quality of English-Japanese automated translation is satisfactory and it is not affected by long sentences. However, complex sentences and uncertainty of the subject (or of the predicate) may give rise to mistranslations. Diab (2021) posits that NMT produces fewer grammatical errors and mistranslations than SMT in the analysis of English-Arabic automatic translations. This is corroborated by Cambedda et al. (2021), who, as mentioned, argue that DeepL (NMT) performs well in the translation from Russian into Italian, although Yandex (SMT) is more reliable with cultural-specific words. By contrast, Skadiņa and Pinnis (2017) find that NMT presents several shortcomings and inaccuracies in view of their English-Latvian post-editing analysis.

As a general rule, scholars suggest applying MT to languages that are known to users, so that nonsense is easily recognizable (Bellos 2011, 256). In this respect, Yanisky-Ravid and Martens (2019) raise important questions regarding the hidden bias produced by automated translation, such as the use of racial expressions, or the switch of female pronouns into male and vice-versa (see also Prates et al. 2020). In particular, they warn against the offence that MT may unknowingly cause in another language and culture (ibid., 131). The social inequalities produced by an indiscriminate use of MT is also discussed at length by Nunes Vieira et al. (2021).

1.4 MT literacy

In order to offset MT drawbacks, users should increase their MT literacy (Bowker and Buitrago Ciro 2019) and be able to weigh its benefits against its disadvantages (Nunes Vieira et al. 2021, 1526). In this way, they would become aware of the limits and potentialities of automated translation, as well as of its permitted applications in different settings (Nunes Vieira et al. 2021, 1526). One way of fostering MT literacy is through pre-editing (Seretan et al. 2014; Mileto 2019) and post-editing activities (Rico 2022).

1.4.1 Pre-editing

Pre-editing techniques were developed at the inception of MT, where pre-editors, often with little experience in the source language, used to change the source text by making it "MT friendly" (Nunes Vieira 2020, 319). Adjusting the source text according to MT features means altering it on the basis of an "effort prediction" (Nunes Vieira 2020, 323), that is the effort that post-editing would require. This implies removing ambiguities and simplifying grammar and vocabulary. Effort prediction is obviously language-dependant. For example, as far as the English language is concerned,

scholars highlight the preponderance of nouns (Aziz et al. 2014).

Still today, the literature advocates pre-editing (Russel and Norvig 2003, 851; Ketzan 2007, 233), especially in translation training (see Mileto 2019). For example, in order to pre-edit texts effectively, Takakusagi et al. (2021) propose writing the subject and predicate clearly, as well as avoiding (or removing) compund sentences. Mileto (2019) carries out a classroom observation study where she aims at verifying the effectiveness of MT integrated with procedures such as pre-editing, post-editing, the use of translation memories and specialised glossaries. In her findings, she explains that all these techniques are successful, although rather time-consuming.

1.4.2 Post-editing

A balance between MT advantages and disadvantages is found in developing translation processes whereby documents are firstly translated by an MT tool and then reviewed by a human translator (Mulé and Johnson 2010, 34; Wahler 2018, 131). This procedure is referred to as post-editing (Nitzke et al. 2019; Nunes Vieira et al. 2019; Nunes Vieira 2020) and is argued to be successful in reducing many risks and drawbacks of automated translation. Thanks to post-editing and other CAT tool applications, scholars claim that the boundaries between human and machine translation have become somehow blurred (Castilho et al. 2018, 11).

At the dawn of MT, post-editing was perceived as a nuisance and mainly a sort of passive activity (Melby 2020; Nunes Vieira 2020, 319). Human editors, referred to as "human partners" (Bar-Hillel 1951, 230), acted in an MT-centred process with a view to tackling the inaccuracies of automated translation (Nunes Vieira 2020, 139). Hence, non-expert source-language pre-editors worked together with non-expert post-editors.

In current MT-driven studies, humans (namely, educated users) are at the centre of the translation process, although some scholars still suggest replacing translators with simple "bilingual editors" to perform post-MT tasks (Smith and Bernard 2022, 54). This alternative option, however, is not risk-free, as the style of machine-translated texts may be inconsistent with the source text style. Alternatively, the target text may contain infrequent collocations[1], which inexperienced editors could not detect (ibid., 56). For these reasons, using professional translators to post-edit

[1] Collocations are words that often appear together; hence, they represent patterns of language usage (Gatto 2014, 29-30).

MT output is generally considered the best option.

One of the advantages of experts' post-editing is the fact that professional post-editors can assess the automated translation accuracy by, amongst others, verifying word usages in context (Mulé and Johnson 2010, 34). For this reason, Nitzke et al. (2019) list a series of competences that translators should develop when approaching MT. They claim that post-editing is an activity that needs to be cooperative, where clients, project managers and translators (or better, post-editors) work together to a common goal (ibid., 252). For these reasons, they focus on the development of instrumental, research-based and post-editing skills (ibid., 250).

Evidently, post-editing cannot take place without the use of critical thinking. In this respect, Junzheng (2021) remark the importance of developing a critical approach to post-editing in order to evaluate MT output and address translation issues. Also, as can be guessed, post-editing is language-dependant, as the efforts required to post-edit target texts vary on the basis of the language pairs addressed (Ragni and Nunes Vieira 2022, 144).