The human factor in translation technologies.

Impact of a participatory approach on job satisfaction, motivation and attitude in public administration.

Fiorenza Mileto, M.Ed

Thesis submitted for the degree of
Doctor of Philosophy (PhD)

School of Applied Language and Intercultural Studies
Dublin City University

Supervisors:
Dr Joss Moorkens
and
Dr Federico Gaspari

March 2025

Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy is entirely my own work, and that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

Signed: 

ID No.: 20210848

Date: 06 December 2024

Table of contents

List of Figures

List of Tables

List of Abbreviations

AI	Artificial Intelligence
ANT	Actor-Network Theory
CAI	Computer-Aided Interpreting
CAT	Computer-Assisted Translation
DAG	Department for Justice Affairs
DAP	Department of Penitentiary Administration
DGM	Department for Juvenile and Community Justice
DGSIA	Directorate General Automated Information Systems
DGT	Directorate-General for Translation
DOG	Department of Judicial Organisation, Personnel and Services
DT	Digital Taylorism
ELIS	European Language Industry Survey
FIGS	French, Italian, German, Spanish
HCAI	Human-Centered AI
HCAI	Human-Centred Artificial Intelligence
HFES	Human Factors and Ergonomics Society
IEA	International Ergonomics Association
LSP	Language Service Provider
MMR	Mixed Methods Research
MT	Machine Translation
MTUX	Machine Translation User Experience
NMT	Neural Machine Translation
OCR	Optical Character Recognition
OPP	Obligatory Passage Point
PE	Post-editing
PM	Project Manager
SMT	Statistical Machine Translation
TAM	Technology Acceptance Model
TB	Termbase
TEnTs	Translation environment tools
TER	Translation Edit Rate
TM	Translation Memory

TS	Translation Studies

Abstract

The human factor in translation technologies. Impact of a participatory approach on job satisfaction, productivity and perception in public administration

Fiorenza Mileto

The objective of this 12-month workplace research at the Ministry of Justice was to introduce translation technologies into a low-technology work environment with highly specialised linguistic skills. In doing so, the aim was to map the human-machine interaction and describe it using actor-network theory, investigating the impact of the introduction of such technologies on the motivation and satisfaction of linguists, and the influence of translators' attitude to translation tools on the acquisition of new skills. The ministerial environment and the use of translation technologies in legal translation are two other essential elements of this study.

In particular, the research aimed at verifying whether a participatory/bottom-up approach in line with the principles of augmented translation (Sakamoto and Yamada, 2020; Lommel, 2017), involving linguists in all the organisational aspects (Cadwell, O'Brien and Teixeira, 2018), as well as the improvement of technical skills through training (do Carmo, 2020), could have a positive impact on motivation, satisfaction and technological transformation. A three-phase convergent parallel mixed methods design was applied to carry out the study.

The results showed that the proposed approach helped some of the participants to find their own sustainable workflow (Moorkens, 2020), to adapt the use of NMT to their needs (Ehrensberger-Dow, 2014), and to stimulate their motivation and satisfaction (Herzberg, 1987; Rodriguez-Castro, 2015). On the other hand, some participants resisted the change, primarily due to the risks arising from the misconception on the part of management regarding the utilisation of translation technologies. Furthermore, the study provides a step towards a potential solution to MT adoption challenges, such as those reported in the article "The Present and Future of Machine translation" (Nimdzi, 2022).

Chapter 1 Introduction

1. Introduction

Research has shown that expectations regarding productivity for many professional translators are on the rise. This is partly due to the influence of translation technology and the increasing use of Machine Translation (MT)[1] by employers, often without corresponding increases in remuneration or improvements in working conditions (Ruokonen and Mäkisalo, 2018; Sakamoto and Yamada, 2019). Such circumstances may give rise to translators' reluctance to utilise such technologies. In recent research on job satisfaction (e.g. Moorkens, 2020a), one of the main findings of previous studies (Courtney and Phelan, 2019; Svahn, 2020) is confirmed: despite unfavourable working conditions (such as uncertainty, unfair rates, time pressure and excessive workload) and a lack of professional status, translators report high levels of job satisfaction. As evidenced by research conducted by Vieira and Alonso (2018), the utilisation of MT by professionals engaged in the production cycle of a translation project gives rise to numerous issues, the majority of which pertain to the human factor rather than the technological aspects. A significant number of translators have highlighted issues related to the lack of transparency and training, the limited information available about MT, the unclear processes involved, as well as the costs and time pressure. Additionally, there is a negative perception of this technology, which is seen more as a threat to professional translators than as a support. The findings of previous studies (e.g. Texeira, 2014; Sakamoto and Yamada, 2020) indicate that the attitude of translators towards technology is as crucial as the efficiency of the technology itself when analysing outcomes such as productivity, quality and cognitive effort related to the utilisation of translation technologies in a professional setting.

The integration of various technologies (translation memory (TM) based tools, terminology management tools, quality assessment tools, etc.), which are used not only to support human translators but also to compensate for the "deficiencies" of MT engines, has created a new complex scenario in which the interaction between humans and artificial intelligence (AI) should be investigated, taking into account additional aspects: the human factor of translation technology. According to Lavault-Olléon (2011), while ergonomics examines the cause-effect relationship between individual well-being and system performance, it is crucial to consider the human factor in interactions with the system. Brunette and O'Brien (2011) discuss the growing complexity of the translator's work environment. This involves combining traditional translation activities, such as using TMs for tasks like 100% match review, fuzzy match repair, translation from scratch, terminology search in TBs and online resources, layout and tag management, with MT post-editing (PE) activities.

[1] In the present study, the term Machine Translation (MT) is used as a high-level term to identify all types of engines.

Many studies (e.g. Doherty et al., 2010; Lacruz and Shreve, 2014; Mellinger, 2014) report that measurable and objective data, gathered in various experiments conducted with the help of professional translators, prove that the introduction of MT speeds up translation, even in the legal sector (Killman and Rodríguez-Castro, 2022). Terribile (2023) confirmed this result in her large-scale analysis of translation and revision speed in human translation and neural machine translation (NMT) PE (on average, 66% faster at translation stage). However, despite the importance placed on objective parameters such as time, costs, and quality when analysing the impact of translation technologies on translation services, some researchers have also considered the attitude of translators and the influence of the human factor on productivity and resistance to MT (Cadwell et al., 2017; Läubli and Orrego, 2017; Vieira, 2018), confirming in their conclusions that job satisfaction and translators' attitudes are fundamental elements that affects technology adoption. Researchers such as Abdallah (2016) have shifted their focus from solely examining product and process quality (e.g. process steps, measurement of effort) to also analysing social quality – who does what and under what circumstances – as an equally important element. This shift in attention highlights the interdependence of these three quality categories.

Although numerous studies have been carried out in the workplace, including in institutional contexts (as illustrated in Section 2.2.1), none of them analyses the human factor in translation technology in its entirety, i.e. from its initial introduction into the work environment with ad hoc training to its impact on the workflow and the results observed several months later. The few case studies that report on the experiences of companies that have implemented one or more specific translation tools are carried out by the manufacturers themselves and have a promotional purpose[2].

This thesis concerns the workplace research performed in an institutional environment with professional translators to address the relationship between the human factor and the introduction of translation technologies. It focuses, in particular, on the relevance of ad hoc training to evaluate the impact of the adoption of technologies on linguists' sources of satisfaction and motivation, the interaction between human and non-human actors within the ANT network (as explained in detail in Chapter 3), and the influence of translators' attitude on the acquisition and application of new competencies in everyday activities.

This chapter will briefly provide an overview of the research context and a rationale for this study (Section 1.1), before introducing the objectives (Section 1.2), the research questions and hypotheses (Section 1.3), and outline the structure of this thesis (Section 1.4).

[2] https://www.rws.com/customers/
https://blog.modernmt.com/machine-translation-for-the-localization-use-case/

1.1 Background and rationale

From an academic perspective, job satisfaction is a multifaceted phenomenon that encompasses a range of psychological elements, including self-esteem, stress, and self-efficacy (Atkinson, 2012; Hubscher-Davidson, 2017; Courtney and Phelan, 2019). The related concept of motivation is defined as an “unobservable force that directs, energizes, and sustains behaviour over time and across circumstances” (Diefendorff and Chandler, 2011, p. 66) that has "connections with attitudes, affect, well-being, behaviour, and performance. Work motivation refers to the direction, intensity, and persistence of job-related behaviours" (Diefendorff et al., 2022, p. 1). Regarding attitude, Eagly and Chaiken (1995) posit that an attitude is defined as a "psychological tendency that is expressed by evaluating a particular entity with a degree of favour or disfavour" (ibid., p. 414). They further define the evaluated entity as an "attitude object," which they assert is a "person's evaluation of an attitude object" (ibid., p. 414).

The study of motivation and satisfaction in relation to the use of translation technologies is a complex undertaking due to the multi-dimensional nature of the subject and the numerous interrelated factors that influence it. These include improvements or disruptions in daily activities, which have a significant impact on translation technology usage. At the same time, job satisfaction and motivation are also influenced by sociological and ergonomic factors, like interpersonal relationships with colleagues, the organisational structure (such as level of autonomy, internal processes), the work environment and tools used for daily activities (Ehrensberger-Dow et al., 2016; Leblanc, 2017; Lee, 2017; Piecychna, 2019; Virtanen, 2019).

1.2 Objectives of the study

The present longitudinal mixed-methods workplace research was developed over 12 months and involved 22 in-house translators (Section 4.6) in Italy’s Ministry of Justice (Section 4.5). It offers a valuable opportunity to examine the multidimensional aspects of job satisfaction, motivation and attitude to technology in relation to the adoption of translation tools. The focal point of this study is the interaction between human and machine, with the machine regarded as an actor of the emergent network that will be established through the implementation of translation technologies and agency as a consequence of dynamic relationships that are formed among human and non-human actors (Abdallah 2011) within the context of a workplace from an actor-network theory (ANT) perspective (Section 3.3). The implementation of NMT in specialised and high-risk sectors (Section 2.5), such as the Ministry of Justice, has the potential to create new opportunities for translators to utilise their skills and linguistic specialisation in the process of NMT customisation from the outset. In order to achieve this result, translation technology training followed by mentoring had an essential role in the present study to provide them with the necessary level of technological competence (Yamada, 2019) to enable them to work not only as translators but also as post-editors (do Carmo, 2020) and become familiar with the peculiarities of the NMT engine that they are customising with their own linguistic data. As demonstrated by Alvarez-Vidal et al. (2020), training could also have the effect of improving

the (negative) perception of PE held by translators. The translators' autonomy should play a crucial role in developing a tailored working process by incorporating translation technology. The participatory/bottom-up approach adopted in this study is designed to encourage participants to retain full control over the tools they implement in their daily work to meet specific needs, rather than adapting to procedures or workflows designed by IT experts who are not involved in their work. This approach gives translators the opportunity to utilise their linguistic skills and authority, leveraging their professional experience. As opposed to the top-down approach (Section 4.11.1), there was no imposition of pre-existing solutions in the use of tools, which could limit translators' control over their activities and personal solutions (Ehrensberger-Dow, 2014).

This investigation adopts an integrated approach (Chapter 4), considering the personal, technical, and social perspectives. In addition to the associations with intrinsic and extrinsic job factors, I examined factors pertaining to autonomy, interpersonal relationships, organisational processes, the influence of social and environmental factors on translators' behaviour and choices regarding the utilisation or non-utilisation of translation technologies. Furthermore, I investigated the influence of these diverse factors, which were identified by Ruokonen and Svahn (2024) as a significant research gap. This study took advantage of the flexibility of ANT to be combined with other theories (related to satisfaction, motivation, and attitude in workplace research) to investigate specific areas identified as research gaps in the literature review: social factors (Risku, 2020); agency (Kotan, 2010); and greater involvement of linguists in all organisational aspects of translations technologies (Cadwell et al., 2018; Sakamoto and Yamada, 2020). The goal was to explore the main factors identified as elements that could influence translators' satisfaction and motivation and, consequently, the adoption and acceptance of translation technologies among in-house translators in a complex organisation like a ministry.

The characteristics of the working environment of the Ministry of Justice helped me to focus on some specific factors identified as research gaps in the literature review (Section 2.2.1). In particular, the possibility of initiating the process from the outset, taking into account not only the needs of the Ministry but also those of the participants, without prioritising economic considerations but rather focusing on effectiveness, with the shared objective of training a custom NMT engine (Section 5.4), while allowing for the setting of intermediate objectives in line with the results obtained at each stage. The influence of factors such as agency and autonomy of choice on technology adoption (Cadwell et al., 2018) could also be examined, given that the change was facilitated by some linguists and that they were free to opt out or into the intervention.

In addition, the design of this study also attempts to capitalise on two main contingencies. First, it was possible to involve the Italian Ministry of Justice in this research thanks to the favourable circumstances created by the new digital transformation policy promoted by the Italian government in public administration. As a consequence of the recommendations of the Council of the European

Union of 9 July 2019 with the 2019 Stability Programme of Italy, the Law n. 134 of September 2021, in paragraph 18, approves the plan for the digital transformation of the administration of justice. Therefore, the management and translation of the documents of the Directorate General of International Affairs and Judicial Cooperation for the European Judicial Network became one of the priorities of the Ministry of Justice and the proposed research project met the growing needs of the internal translation department.

Second, it was a work environment with little use of translation technology and experienced staff with highly specialised language skills in the legal sector, which was one of the least researched areas at the time of the preliminary study I conducted with students (Mileto, 2019) and when the research began in 2021. Recently, the use of technology in the legal sector in government environments has gained significant momentum (e.g. there was an international symposium on the use of AI in legal translation in the European Union in March 2024, and the international translation journal *Perspectives* is preparing an issue dedicated to the use of AI in legal translation to be published in 2026). The fact that translation technologies had not penetrated the work environment of the Ministry of Justice when the research began was a favourable circumstance that allowed me to propose a new approach to the introduction of such technologies (i.e. a bottom-up approach, as described in Section 4.11.1).

1.3 Research questions and hypotheses

Two key elements of the present research are the specific work environment under examination and the pivotal role of the human factor in achieving a balance between human and machine, which has the potential to influence job satisfaction, motivation, and attitude towards technology.

The approach adopted to introduce translation technologies in the Ministry of Justice was designed with the objective of assisting translators in establishing a sustainable workflow (Moorkens, 2020b) (Section 2.3), adapting the use of NMT to their needs (Ehrensberger-Dow, 2014), and fostering motivation and satisfaction (Herzberg, 1987; Rodriguez-Castro, 2015), thereby exerting a favourable influence on the adoption of translation technology. Training was another crucial element of the intervention, aimed at assessing whether the technological competencies and confidence of translators in the utilisation of translation technologies and NMT would increase in tandem (do Carmo, 2020), thereby enhancing their perception (Alvarez-Vidal et al., 2020).

This thesis aims at answering two main research questions (RQs), each of them further divided into three sub-questions:

1. When employing a participatory approach to the introduction of NMT integrated with CAT tools in an institutional translation production network:

    1.1 What are the sources of motivation/demotivation and the sources of satisfaction/dissatisfaction in relation to the use of translation technologies?

1.2 What is the impact of non-human actors on the internal network of participants from an ANT perspective?

1.3 What is the impact of a participatory/bottom-up approach on the adoption of translation technologies?

2. When considering the attitude towards translation technologies over time:

2.1 What is the impact of attitude on technology adoption?

2.2 Does training have an impact on attitude?

2.3 Does the social dimension influence attitude?

According to the review of previous research performed in the same field and considering the RQs, I formulated a set of research hypotheses to be tested in the present study:

1. self-determination and decision-making are factors that have an impact on institutional translators' satisfaction (Ehrensberger-Dow and Massey, 2017);
2. greater involvement of linguists in all organisational aspects of translations technologies is a factor that has an impact on translators' motivation (Cadwell et al., 2018; Sakamoto and Yamada, 2020);
3. training and mentoring are essential elements of the intervention: the more translators' technological competences and confidence in the use of translation tools and NMT grow (do Carmo, 2020), the more their attitude towards technology will improve (Alvarez-Vidal et al., 2020);
4. the age and IT skills of participants could have an impact on technology adoption;
5. the attitudes to translation technology may have a considerable impact on the stability of the novel network of human and non-human actors that will emerge;
6. professional curiosity could grant the commitment towards the objective of training the NMT engine and reach the necessary stability within the new emerging network;
7. both human and non-human sources of disappointment exert an equal influence on the equilibrium of the actor network.

1.4 Overview of thesis structure

Following this introduction, Chapter 2 will present a critical review of the existing literature on the subject of workplace research in the field of human factors in translation technology adoption. It will also identify the research gaps to be further investigated in the context of the Ministry of Justice. Chapter 3 will describe in more detail the principles and theories underpinning the research project, the key variables and the relationships between them, providing a foundation for the research design and data collection. They are the theoretical construct used by Rodriguez-Castro (2015) to develop her tool to evaluate job satisfaction, Herzberg's theory (1987) to investigate motivator and demotivator factors on the job, and the approach of Rossi and Chevrot (2019) to analyse the impact

of translators' attitude on technology acceptance. Particular attention will be given to the key concepts of ANT and how they are adapted to the present research. Chapter 4 will be dedicated to the description of the mixed methods research (MMR) and multiphase design applied to data collection and analysis, why I chose this approach, and what are the advantages and disadvantages. The bottom-up approach adopted in technological innovation will be compared with the more traditional top-down approach., and the difference with the bottom-up approach in qualitative data coding. I will describe the environment, the participants and the instruments I used to collect data (questionnaires and interviews, integrated by analytic memos), and how I analysed data: frequency analysis for quantitative data using the statistical analysis software IBM SPSS; and thematic analysis for qualitative data using the software NVIVO. Chapter 5 is devoted to technological aspects, training and linguistic elements, with a description of the tools used, training design, procedures adopted, and the evaluation of the outcomes of the training of the NMT engine. Chapter 6 will be dedicated to the analysis of data from the ANT perspective and the investigation of the relationship between human and non-human actors. Chapter 7 will focus on the analysis of satisfaction, motivation and attitude in relation to technology adoption, and Chapter 8 will be dedicated to conclusions, limitations and impact of the present research.

Chapter 2 Literature review

> "[…] for 'the potential of this technology to be fully realized in professional translation […]' [will require] more research focused on NMT as a tool for translators who, in professional settings, should also be regarded as end-users of the technology and be able to provide perception data on their user experiences"
>
> "While time management is important for translators, it is worth noting that […] expectations and perceptions of target-text quality, and, more generally, job satisfaction […] can […] affect translators' speed in the long term, but they are also central to conceptualisations of human translation as a professional practice"
>
> (Ragni and Nunes Vieira, 2021, pp. 14-15)

2. Bridging algorithms and the human factor

The attitude towards technology is one of the factors that this study explores in terms of its impact on participants' satisfaction and motivation in their work environment. I have taken into account the considerations and suggestions that have emerged from studies investigating the human factor in the use of translation technologies, specifically MT in earlier studies and NMT in the most recent ones. According to these studies, there are various factors that influence the adoption of technologies in the workplace, not only related to the working environment, the technical aspects and the type of work, but also to the social and personal sphere. The following sections provide a comprehensive review of recent research, including different scenarios and methodologies used to identify research gaps, hypotheses to be tested and appropriate research methods.

I will begin by exploring the concept of the human factor and some examples of workplace research in the field of translation technologies, as well as the hypotheses that inspired some areas for further investigation (Sections 2.1 and 2.2). Section 2.3 analyses how the role of translators as active and passive agents has evolved in Translation Studies (TS) research over the last decade, and why the interest of researchers has shifted from the analysis of purely technical aspects related to the use of translation technologies (i.e. productivity, quality, speed, etc.) to the assessment of potential risks arising from the use of NMT and its impact on the daily activities required of translators (Section 2.5). In Section 2.6 I will describe some studies focusing on the impact of translators' attitudes and perceptions on the use of technology, particularly in institutional settings. The last section summarises the main points of the chapter.

2.1 The human factor in NMT. The role of translators in translation technology research

According to the International Ergonomics Association (IEA), the concepts of ergonomics and human factors overlap: "Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance. Ergonomists contribute to the design and evaluation of tasks, jobs,

products, environments and systems in order to make them compatible with the needs, abilities and limitations of people" (IEA, 2016, http://www.iea.cc/ergonomics/). On the other hand, the Human Factors and Ergonomics Society (HFES) makes a distinction between ergonomics and human factors, specifying that "Human Factors is concerned with the application of what we know about people, their abilities, characteristics, and limitations to the design of equipment they use, environments in which they function, and jobs they perform" (HFES, https://www.hfes.org/About-HFES/What-is-Human-Factors-and-Ergonomics). The terms 'human factors' and 'ergonomics' are defined also in other contexts (i.e., NASA, FDA, MDDI etc.), but the above-mentioned definitions by IEA and HFES include the key elements that will be analysed in the present study: analysing the interaction between translators and translation technologies with the intention of ultimately moving towards a sustainable workflow that considers linguists' abilities, expectations, and limitations. It is noteworthy that research on the human factor in technology forms part of a broader trend that extends beyond the field of translation. This trend encompasses the development of human-centred AI and the concept of augmenting human abilities: "A new synthesis is emerging that integrates Artificial Intelligence (AI) technologies with Human-Computer Interaction to produce Human-Centered AI (HCAI). Advocates of this new synthesis seek to amplify, augment, and enhance human abilities, so as to empower people, build their self-efficacy, support creativity, recognize responsibility, and promote social connections" (Shneiderman, 2022, p. 1).

Ragni and Vieira (2021) conducted a study analysing research on the impact of translation technologies on the relationship between human and machine, taking into account the future development of translation processes and the translation profession. The authors analysed English-language articles about the human factor in NMT published between 2015 and 2019 and identified the main research trends in this field. According to their findings, published research is mainly focused on NMT PE process and productivity, not on the global workflow involved in the process. In this perspective, NMT improvement is the subject (the element to be improved) and not the object (that is a tool to help translators) of research. Because of this approach, translators are not considered among the "end users" that will benefit from NMT as a tool to speed up their job and their perceptions of NMT are scarcely investigated: "NMT research is disproportionally focused on establishing MT's potential benefits and drawbacks in terms of time (and therefore cost) savings. […] expectations and perceptions of target-text quality […] and […] job satisfaction are also important variables to consider" (ibid p.15). A pivotal element reported in the article by Ragni and Vieira is the conceptualisation of the end-user of NMT. The prevailing idea of the end-user in TS research refers to a lay audience, Language Service Providers (LSPs), institutions, and more generally those who exploit NMT to understand a text in another language and those who use NMT as a productivity tool. However, the perspective of translators as end-users of NMT as a tool, and not as text consumers, could cast new light on the relationship between human and machine. Translators should be considered not only as NMT quality evaluators, but also as technology users for their own advantage,

to improve their daily work and productivity. This is one of the findings that suggested the use of a different approach to the introduction of translation technologies in the present research: the participants are not simply requested to evaluate the output of the engine they are contributing to customize, but they are also requested to specify which is the best way to use the NMT output according to their linguistic experience or when it is better not to use it according to their needs and working experience.

As reported by Sánchez-Gijón et al. (2019), but also by Forcada (2017), Castilho and Guerberof Arenas (2018), Heinisch and Lušicky (2019), Lesznyák (2019), there are still very few studies gathering perception data of translators' user experience on the usefulness of MT as a tool. Briva and O'Brien (2023: 335) in their article suggest the "concept of Machine Translation User Experience (MTUX) for assessing, evaluating, and getting further information about the user experiences of people interacting with MT". This is one of the research gaps that this study aims to fill, by investigating whether a negative perception of NMT resulting from mistrust could affect the adoption of translation technologies and could be improved by training and optimising the daily work of the linguists at the Ministry of Justice, during the experimental phase and after its completion.

2.2 Earliest examples of workplace research in TS

Workplace research is a relatively new approach in TS, but it has rapidly developed since the first experiments. Hébert-Malloch (2004) was one of the first researchers to investigate the workday of a colleague in the Canadian federal government's translation bureau. She recorded and analysed over 150 hours of tasks and activities on the computer of a colleague to evaluate productivity, technical and linguistic strategies, adherence to instructions and norms set by the institution and clients. Koskinen (2008) conducted an ethnographic study in the Finnish translation unit of the European Commission, drawing on her previous professional experience in the unit. The study employed on-site observation, interviews, and focus group discussions to analyse the internal document production and translation process, as well as the social relationships and translators' roles in the workflow. However, while they both delve into the realities of professional translation, they differ in their focus: workplace research adopts a more targeted approach, focusing on specific aspects of a translator's work environment. For instance, a workplace research study might investigate translator decision-making under pressure or the impact of technology on translation quality. Ethnographic research, on the other hand, immerses itself in the translator's working environment. Researchers become embedded observers, participating in the daily routines and social interactions of translators. This allows for a holistic understanding of the translation process, encompassing not just technical aspects but also the cultural and social dynamics at play. By employing both workplace research and ethnographic research, it could be possible to gain a richer understanding of the translator's lived experience. Workplace research offers insights into specific challenges and decision-making

processes, while ethnography provides a deeper understanding of the social and cultural context that shapes translators' work.

These two early on-site studies immediately revealed two key issues related to workplace research implementation, as suggested by Ehrensberger-Dow and Massey (2019). First, the classical methods adopted in the laboratory or classroom could not be transferred as they were to a working environment. They must be adapted and sometimes combined in order to perform a triangulation where it was not possible to gather data with the most appropriate method generally applied in controlled environments. These limitations may be linked to particular security or confidentiality requirements of the workplace, logistical problems, or system requirements for the installation of devices or software used to perform the research (i.e., eye-trackers or keystroke loggers etc.). Second, one of the main obstacles to establishing a partnership with an institution or a company to be involved in the research was mutual trust. Before performing workplace research, the researcher needs to gain participants' and hosts' trust, and becoming familiar with one or more members of the organisation is an advantage (Risku, 2017).

2.2.1 Impact of translation technologies on translators' autonomy and agency in workplace research

Another example of workplace research is research done outside of institutions. This involves freelance translators working for LSPs or companies. Such research looks at issues like translators' working conditions, experience, education, wages, influence, and perception. Lagoudaki (2006) was one of the first researchers to investigate the diffusion of translation technology. She conducted an international study on TMs and CAT tools using an online survey. Other examples of this kind of research are the studies done by Dam and Zethsen (2011, 2012) and those done by Katan (2009, 2011). I draw on them as a source of inspiration because they use interesting methods, involve a large number of participants and investigate a variety of elements. Dam and Zethsen's study highlighted a strong discrepancy between the high level of preparation and expertise required to be a professional translator and the low status of the profession. However, Katan's research reveals that translators are generally satisfied with their job. Despite the majority of translators involved in Katan's studies being self-employed, an additional comparable issue was identified that could represent a source of dissatisfaction among those working for organisations and institutions. This issue was observed not only in the analysis of the literature but also in the present research. Sometimes translators who are employed as part of an organisation or institution tend to feel marginalised and not fully recognised for their professionalism compared to other employees in other departments of the same organisation or institution.

Marshman (2014) highlights the importance of evaluating the potential disadvantages of translation environment tools (TEnTs) based on the use of TMs. The survey results indicate that 50% of the 255 professional translators taking part in the survey felt a loss of control over the translation process

due to the introduction of translation technologies. Several studies, including Moorkens and O'Brien (2013), have reported dissatisfaction with the usability of computer-assisted translation (CAT) and machine translation post-editing (MTPE) tools. Ehrensberger-Dow et al. (2016) and O'Brien et al. (2017) have focused on ergonomics in workplace research, exploring issues that make CAT tools less user-friendly, such as segmentation or user interface complexity. They have also highlighted other important aspects that influence translators' satisfaction with translation technology, including employment status and working conditions.

Surveys can provide valuable insights into the experiences and perceptions of translation technology users in various settings, such as companies, institutions, and freelancers. However, they are insufficient for investigating how technology is introduced and used in working environments. Désilets et al. (2009) and Karamakis et al. (2011) adopt observational research and field notes to analyse how translators use different tools in their usual working environment, how they solve problems related to translation or terminology management and translation tools, and what their attitudes and approaches are to everyday work. This qualitative research emphasises the importance of various aspects that impact translation professionals beyond technology. Translators are part of a complex network of professionals involved in the entire translation project process, including colleagues who are not directly involved in the translation activity itself (as is the case with Ministry of Justice translators). Communication, collaboration, teamwork, adaptability, and flexibility are just a few of the elements that could affect translators' daily tasks.

LeBlanc (2013) conducted a study in three private and governmental LSPs to investigate the impact of translation technologies on translators. LeBlanc spent a month job shadowing and conducting interviews in the workplace. One of the main findings reported in the study was the sense of disempowerment felt by translators who believed that their creativity was limited by the guidelines and instructions they had to follow in order to fully utilize CAT tools. This study was later corroborated by workplace research conducted at a Danish LSP (Bundegaard and Christensen 2016; Bundegaard 2017). The research involved screen recordings, keystroke logs, and observational protocols, as well as interviews and commentaries, to gather data on the behaviour of eight translators who were working with MT integrated into a CAT tool. The research confirms that technology has improved translators' performance. However, it has also limited their creativity, forcing them to adapt to suggestions and make up for tool imperfections. Moorkens et al. (2016) reported a feeling of disempowerment associated with the reuse of linguistic data and TMs to enhance the performance of MT and translation technologies. One of the aims of the participatory approach adopted in my research is also to test whether the participants are resistant to change (Cadwell et al., 2018), despite the greater involvement in the overall process or the different approach, and whether the improvements in their work are sufficient to motivate them to use translation technologies (Ruokonen and Koskinen, 2017).

Teixeira (2014) conducted workplace research using a combination of laboratory techniques, such as keystroke logging, screen recording, and eye tracking, and qualitative methods, including interviews and self-report evaluations. The study aimed to investigate how translators' attitudes and perceptions could affect their performance when editing fuzzy matches or PE MT output. Although the methods adopted may have some limitations, one of the most significant findings is that a translator's familiarity and experience with tools greatly impacts their perception of technology and performance. Ehrensberger-Dow and Hunziker Heeb (2016) used a similar combination of research methods to observe a translator at work for three hours. They focused on the ergonomics of the workplace and the translators' interaction with technology, as Teixeira and O'Brien (2017) did. The researchers monitored ten translators working in an LSP using keystroke logging, screen recording, and eye tracking. Additionally, the translators underwent a brief semi-structured interview. The study confirmed the assumption that improved tool ergonomics reduces the cognitive effort of translators. Moreover, the mixed-methods approach proved to be a valid means of compensating for the limitations arising from the lack of control in workplace research.

Cadwell et al. (2018) investigated the factors affecting the use of MT in an institution and an LSP, with a focus on the translators' agency, control over the tools, and autonomy to choose whether to use MT. The research also highlighted the importance of social factors and the interaction of various actors in the translators' social network. Workplace research enables researchers to focus on the process, product, or interdependencies between the actors involved in the organisation (Olohan, 2017). Risku (2004) was one of the first translation researchers to emphasize the significance of the interaction between human and non-human actors. In the revised version of her book (2016), she identifies translation technologies as the catalyst for the change in translation processes and management. Research is currently examining the relationship between translators, technology, and the production networks they are a part of, such as LSPs, institutions, translation departments, freelancers, and crowdsourcers (i.e. entities that outsource their work to the crowd). This is demonstrated by the European Language Industry Survey (ELIS) report (2023). In addition to the ergonomic and cognitive factors, other social and organisational factors (such as time constraints, strict guidelines, and the imposition of specific translation technologies), which can limit translators' autonomy and control over their activities, are gaining importance. This can lead to resistance towards new technologies. Ehrensberger-Dow and Massey (2017) noted that institutional translators expressed dissatisfaction with their limited influence on decisions regarding matters that concern them, such as software procurement and workflow design (ibid p. 116). The lack of self-determination and decision-making in translation management and technology adoption can disempower and alienate professionals, potentially undermining their commitment, agency, and sense of responsibility (ibid p. 106). The findings of the present research are in accordance with the researchers' assumption that the opportunity to participate in organisational aspects could "have the knock-on effect of reducing workplace stress and increasing motivation" (ibid p. 118). Maintaining

complete control over the linguistic data, the manner in which it is employed, and the assessment of outcomes may prove beneficial in ensuring that the translator (and the human factor) remains at the centre of the process.

The aforementioned studies address one or two factors at a time that could be relevant from a human factor perspective for the efficient implementation of translation technologies. However, they have not analysed the complex evolution of all these factors interacting between them in a real working environment with professional translators over a relatively long period of time and considering the role played by a structured ad hoc training. This study aims to address this gap by capitalising on the unique opportunity to access a complex work environment, such as that of a Ministry.

2.3 Translators as active or passive players. The relevance of job satisfaction and motivation

In general, the role and perception of translators about the use of NMT (and MT more generally) as a translation tool is limited to the analysis of their distaste or liking for MT. This approach is at odds with the conventional unilateral strategy typically employed in the introduction of MT (Cadwell et al., 2018). According to the typical top-down procedure adopted in the translation industry, a great amount of linguistic data, produced preferably by human translators, mainly in the form of TMs, are gathered from various sources by engineers to train, and customize where possible, the engine of the machine that will be used for translation. Such an engine "relies on human translation for its training data, but it also relies on human translation for its legitimacy […] is because such corpora are assumed to contain good answers to translation problems […] precisely because they contain translations performed by human beings" (Kenny, 2011, p.2). In this paper published by Kenny more than 10 years ago, the focus was on the relationship between human and machine, and even if the technology examined was Statistical Machine Translation (SMT), the main idea expressed in this study is still applicable to NMT as a data-driven technology: "[SMT] is thus a technology in which human and automatic translation intersect […]. It is also a technology that relies on the ingenuity of both human translators (who produce vital data) and statistically-minded computer scientists (who work out clever ways of using these and other data), and both sets of protagonists might expect to be acknowledged in discussions of SMT" (ibid, p. 2). Although technology can now rely on neural networks and advanced algorithms, linguistic data produced by humans are still critical to the training of an MT engine.

Once the MT engine is customised, translators are requested to post-edit, revise, or evaluate the machine's output. This helps engineers optimize engine algorithms, evaluate PE effort, and identify typical errors. The objective is to assist engineers in improving the machine. Research conducted thus far has shown that in this context, translators tend to work with linguistic data of unknown origin and reliability. They provide their professional experience to assist a machine that is intended to substitute them rather than help them. Furthermore, the diffusion of translation technologies changed the way in which many large translation projects are performed: hundreds of segmented documents

are assigned to various linguists that work on a portion of a more complex job, under time and cost constraints, under the control of a project manager (PM) who represents the interface of a bigger translation company. This is defined as new Taylorism or Digital Taylorism (DT) (Parenti, 2001). The role of translators and their opportunity to act as subject matter experts is diminished by the introduction of translation technologies and (N)MT, and from actors of the translation process, they became factors, or better "tiny cogs" (Moorkens, 2020b), of a greater engine that they cannot control anymore. In this context, translators have limited opportunities to experience those factors that are identified as motivating, according to Herzberg's (1987) motivation-hygiene theory of job satisfaction, among which there are opportunities for achievement, recognition of the job done and professional skills, and adequate rewards (see section 2.4). As suggested by Moorkens, the solution to such deteriorating professional prospects could be the creation of "sustainable work systems focus[ed] on long-term sustainability of human, social, and natural resources" (ibid p.13) enhancing translators' motivation with a proper balance between technological innovation, training opportunities, job satisfaction, salary, status, and working conditions.

A recent study by Lambert and Walker (2024) has confirmed the impact of satisfaction on the interaction with technology. The authors undertook a comprehensive review of Maslow's hierarchy of needs, adapting the conventional pyramid representation to facilitate analysis of a range of industry and academic sources, to explore which challenges related to sustainability or satisfaction are facing translators. According to their findings, technology "can have a positive and/or negative impact on translators' sense of esteem, belonging, financial wellbeing, and wider professional-existential concerns, making it a fitting inclusion at several levels" (ibid, p. 99).

The investigation of job satisfaction in a general working environment, not strictly related to translation, was pioneered by Locke (1969) and Spector (1997). Subsequently, de Jong (1999) focused on the relationship between job satisfaction and stress, as well as motivation. In researching the job satisfaction of government-accredited Irish language translators employed directly by institutions, Moorkens (2020a) confirms one of the main findings of previous studies (i.e. Katan 2009, Ruokonen and Mäkisalo 2018, Courtney and Phelan 2019, Svahn 2020): notwithstanding the working conditions (uncertainty, unfair rates, time pressure, excessive workload, etc.) and professional status, translators are highly satisfied with their work (Ruokonen et al., 2024). Among recent studies focused on translation, there is the instrument created by Rodríguez-Castro (2015) to measure translator job satisfaction. The particularity of this instrument is that it takes into account not only the various tasks performed by translators, but also the working environment. According to her findings, translators' job satisfaction derives not only from "successful completion of projects, ability to perform a wide variety of tasks, and intrinsic pride in their work" (Rodríguez-Castro, 2016, p. 223), but also from the relationships they have with other actors taking part in the translation process. In a recently published paper (2024), she revisited the principles initially expressed in her

earlier work, with a view to incorporating recent technological developments. She reiterated the importance of training and workflow improvement in order to transform new translation tools, including AI and advanced NMT, into a source of satisfaction rather than dissatisfaction.

In academic research, job satisfaction is often related to motivation, stress and self-efficacy (e.g. Atkinson 2012, Courtney and Phelan 2019, Koskinen 2020). In the professional context, job satisfaction is more related to sociological and ergonomic factors such as personal relationships, job security, autonomy, organisational processes, technologies, and tools required to perform the job (Ehrensberger-Dow et al., 2016; Leblanc, 2017; Piecychna, 2019; Virtanen, 2019). In a Translation Spaces special issue (April 2024) dedicated to translators' and interpreters' job satisfaction, Ruokonen et al. (2024, p. 1) in the introduction define "job satisfaction a prime example of a multidisciplinary phenomenon that requires a variety of theoretical and methodological approaches", going beyond the translators' job satisfaction paradox according to which they are "often highly satisfied with the intrinsic nature of their work" notwithstanding "their professional status and working conditions". They underline the impact of job satisfaction on individual commitment and organisational performance (Spector, 2022), as well as on the acceptance of changes and new challenges linked to translation technologies.

2.4 The relevance of translators' attitude to MT and PE

The investigation conducted by Sakamoto and Yamada (2020) aims to explore the significance of the *marginalization* and *disempowerment* of translators within the overarching context of the translation process, with a particular focus on the integration of PE. They used the focus group approach to gather data about the experience of PE from the perspective of 22 PMs working in Japan. The research is performed adopting a Social Construction of Technology (Kline and Pinch, 1996) analysis to evaluate how factors such as prices, work experience, working environment and involvement of different actors in the translation workflow (i.e. PMs, clients, LSPs and translators, identified as *social groups*), can influence PE diffusion and practice. PMs' attitudes towards MT, their position within LSPs, clients' requests, LSPs' need to satisfy these requests, and the distinction between traditional and technological translators all shape perception regarding MT and PE. This perception influences the translation process, engaging all parties involved.

According to Sakamoto and Yamada (2020), conflicts between social groups can lead to problems with pricing of PE, recruitment of post-editors, and PE guidelines. One potential solution to these issues is to adopt a top-down approach, such as implementing TAUS's PE guidelines or the ISO 18587 (2018) standard to regulate PE production processes. However, an analysis of the dynamics observed in the focus groups suggests that a rigid implementation of such guidelines could lead to further complications (Rico Pérez, 2024). Instead, exchanging information and best practices among social groups and between social groups could help redefine problems and generate shared solutions. Sakamoto and Yamada argue that this bottom-up approach would utilise the experience

and skills of individuals to establish new best practices for all stakeholders. This proposal represents a first step in giving more relevance to the social agency of translators' social group, which may trigger a positive attitude towards MT. The authors suggest that in this perspective, the human factor should prevail over technological requirements, and all social groups should participate in and benefit from the process. The present study investigates the influence of a participatory approach that fosters translators' autonomy on participants' attitudes towards translation technologies.

Translators' perception of MT also proved to be a pivotal element in the acceptance of MT in the intervention carried out by Rossi and Chevrot in the French language department of the European Commission (Rossi and Chevrot, 2019). The investigation of translators' attitudes towards MT represents a comparatively novel development, as evidenced by the recent emergence of research focusing on the professional translators' workplaces (Ehrensberger-Dow and Massey, 2019). These studies seek to assess the efficacy and practicality of customised MT engines.

According to Pym and Torres-Simón (2021), workflow automation and translation technologies are significantly altering the translation industry, redefining the skill set of translators in the era of automation. Evidence suggests that certain market segments are disappearing as a result of automatic translation. However, the introduction of NMT in more specialised and quality-focused linguistic sectors is creating new opportunities to utilise translators' skills "to authorize and humanize the results of automation" (Pym and Torres-Simón, 2021, p. 1). Certain sectors, such as legal or medical translations, have strict requirements for linguistic quality. A terminological error (such as the term "prosecutor", which can be translated into Italian in two different ways, corresponding to two different roles) or a mistake in a number (such as in a legal article or in the dosage of a medicine) are likely to have significant negative consequences. In these cases, the translator's experience and linguistic specialization are crucial in suggesting and "authorising" the use of MT. This helps to prevent clients or PMs from using MT inappropriately (Sakamoto and Yamada, 2020, p. 15). However, according to Yamada (2019), this new role would require not only language skills but also a high level of technological competence. Once again, as stated by Rodríguez-Castro (see section 2.1), the researcher underlines the importance of training in translation technologies for both students and professional translators, in this regard. The significant training element that was involved in this workplace research project is described in detail in Section 5.3.

2.4.1 PE: complex skills for a (supposed) simple process

A completely different perspective of PE guidelines and ISO standards is provided by do Carmo (2020). According to his analysis, ISO standards, instead of improving translators' working conditions, contribute to their deterioration because they "send a mixed message about simplicity or complexity of PE, with a negative impact on the perception of the value of work done by translators" (do Carmo, 2020, p. 8). The researcher goes further in his analysis and demonstrates how the simplified definition of the PE task provided by one of the most authoritative regulation documents

of the translation industry, ISO 2017, implicitly conveys the idea that editing and correcting MT output are faster and easier than translating from scratch. In fact, the primary goal of the PE task is to increase productivity by editing the minimum amount necessary from MT output. As reported in the same document, the aim is "to produce an output which is indistinguishable from human translation output [...] [and] post-editors [are recommended to] use as much MT output as possible" (ISO 2017, 8). Comparing such guidelines with those provided by TAUS, the results do not change. "Human-like quality" is the standard to be reached and the imperatives are: productivity increase, time reduction, avoid over-editing of MT output. However, do Carmo, mentioning also one of the earliest studies on PE (Krings, 2001), demonstrates that PE is a more complex task than that briefly outlined by ISO standards or the TAUS description. In fact, post-editors have to find a balance between guidelines, translation instructions, glossaries, TMs and other reference material they have to consult before deciding to keep or to amend the MT output. In addition, they often work in a complex software environment (made up of various small windows providing different solutions retrieved from different sources) under time constraints, and they have to annotate recurring MT errors as feedback for engineers to improve MT performance. Furthermore, to expand on this scenario, sometimes they work in a network made up of other post-editors, reviewers, PMs, and language specialists, all influencing the PE task for the phase in which they are involved.

A possible solution suggested by do Carmo to help post-editors meet quality and productivity expectations would be proper training on specific linguistic and technological skills, such as: deep understanding of the subject they are translating; knowledge of the specific characteristics of each MT system (every system is different from the others) in order to anticipate the issues of the output to amend; being familiar with the other translation technologies they are using; quick reading and error-spotting abilities; and last but not least, good communication skills in order to interact with the rest of the team. "The contradiction is in the fact that, for processes to be simple, translators need to make complex decisions and control a demanding environment" (do Carmo, 2020, p. 12). Therefore, notwithstanding the reported gains provided by MT, there is a significant aversion to the PE activity.

This is the reason why, in the present study, the training phase was followed by a mentoring phase (Section 4.7), because, given the very low use of translation technology and the generally basic IT skills of the participants, it was important to furnish the participants with a comprehensive understanding of the characteristics (both potential and limitations) of the tools and the NMT engine they were learning to use, not only to turn translation technology into a source of satisfaction (Rodríguez-Castro, 2024), but also to help them exercise their linguistic authority to authorise the use of NMT in specific contexts, avoiding inappropriate uses (Sakamoto and Yamada, 2020), while maintaining full control over the whole process (do Carmo, 2020).

2.4.2 Introducing NMT in translation workflows and the human-centred perspective

Even if the academic research demonstrated in various studies that PE is more productive than translating from scratch (Federico et al., 2012; Parra Escartín et al., 2015; Koponen, 2016; Castilho et al., 2017), it is important to note that these assumptions are based on limited timeframes, text types, and participants. As noted by do Carmo (2020) such productivity experiments are generally performed in particular working environments, on a complete document, and not on part of it as is increasingly commonplace (Moorkens, 2020b), with a limited number of instructions, isolated from all the additional factors that could negatively affect the improvement in productivity granted by translation technologies. That is why it is extremely common in the translation industry that the positive results obtained in pilot projects in terms of time, cost and quality, are not reflected in the deployment of (N)MT in the same project or product in the real working conditions (Terribile, 2023). This is often due to *details* (such as the IT skills of translators, file formats, IT requirements, existing task management etc.), linked to the complex workflow of a translation project that are rarely considered in academic research or exploratory projects (Mileto, 2019). An example of this perspective is the research performed by Vieira and Alonso (2020) who investigated the use of MT in the professional environment from "management and production perspectives" showing "how MT can add uncertainty to translation services and in turn exacerbate issues relating to miscommunication and work fragmentation" (ibid p. 16). The communication issue reported by Vieira and Alonso is confirmed as a major underestimated collateral problem when introducing PE in traditional translation workflow also in another study by Alvarez-Vidal et al. (2020, p. 55), who wrote that "[t]he focus of the translation workflow should be the human translator and MT should be used as a way to improve a human-centred process". Another noticeable finding in this study is that the translators' negative perception of PE (mainly influenced by external factors more than by personal experience) improves with PE practice and training.

However, there are few studies investigating how a lack of communication and collateral activities linked to a translation project, such as communication management, working environment preparation, and translation software familiarisation and troubleshooting, can have a negative impact on the successful implementation of technology. This is mainly due to the complexity of research on the job and the difficulties in collecting measurable data. A study by Vieira et al. (2021) analysed the effects of tracking translators' activity in a real working environment over sixteen weeks. The study included seven in-house and nine freelance translators who self-monitored the time spent on each task performed. The results revealed that productivity tracking can be useful for cost-effective project management. However, it can also have a negative impact on the translator's work and attitude. As previously mentioned, there are "ancillary (invisible) tasks that translators must perform and that are not seen" (ibid, p. 10).

In the present study the difficulty of tracking translators' daily activities required a careful planning of the data it was possible to collect and the methods it was possible to use in order to fulfil three

parameters: specific data needed to answer the RQs; Ministry of Justice security requirements; and reduce to the minimum the impact of data collection on the daily activities of participants that could not be interrupted. Despite such limitations, combining the different functions provided by the tools adopted, it was possible to keep track of the NMT engine quality after training (automatic scores and human evaluation) and evaluate the impact of the customized engine on the daily activities of participants (thanks to a PE tracking plug-in integrated in the CAT tool). Further details about the difficulties and the solutions adopted in the present study can be found in Section 5.5.

Echoing Vieira (2020), Macken et al. (2020) highlight how the research methods used in experimental studies are not applicable in real working environments with professional translators involved in complex translation workflows. The comparison of this intervention performed at the Directorate-General for Translation (DGT) with 20 professional translators for two languages with the study performed by Cadwell et al. (2018) with 70 professional translators for 24 languages, highlights a fundamental difference. Both studies aim at measuring the impact of MT on translators' job and their attitude towards PE, but they apply different methodologies and investigate the issue from different perspectives: Macken et al. (2020) focus on productivity and try to apply a research methodology that will provide quantitative data without affecting the normal working activities (segment details recorded in TMs during translation and video recording); Cadwell et al. (2018) focus on human factor and ergonomics, and rely on a focus group approach in order to gather qualitative data based on translators' perception (applying thematic analysis to the focus group data). Notwithstanding these differences, a common key factor emerges which influences the attitude of translators: the socio-cultural environment of the DGT. Translators are actively involved in the whole process of development and implementation of MT from the beginning; translators are employees and they do not risk losing their jobs due to MT; translators are free to use MT or rely only on TMs during translation; and they feel part of an entity that recognizes and values their professional profile. Another important element differentiating the two studies is the great improvement in MT output quality introduced by neural engines.

2.5 Potential risks linked to NMT fluency and sustainable workflows

The improvements introduced by NMT to the quality of output had a considerable impact on translators' attitude towards PE. In 2015, MT output quality was one of the key elements for MT non-adoption. In 2022, NMT output quality is perceived as a good enough to be used as a starting point for translation and it is preferable to starting from scratch (Farrell, 2023). However, this is not universally true, it may vary according to domain, language combination and linguistic data availability. Now there is a different problem linked to quality: the output is so fluent that it could deceive translators (Daems and Macken, 2019), diverting their attention from mistranslation or terminology errors.

Particularly relevant in this perspective is the research performed with nine in–house DGT English–Polish translators who used the eTranslation NMT system integrated in a CAT tool to increase productivity while attempting to maintain quality (Stefaniak, 2020). The intervention was conducted in 2018 and lasted for three months. It covered various subject domains such as climate, human health, justice, finance, and migration. The study concluded that the risks to the quality of translations were too high to justify a modest gain in productivity. Specifically, the study highlights the need to correlate the usefulness of NMT output with the specific requirements of the subject or domain being translated. Consequently, even if the NMT returned well-formed sentences resulting in a less demanding PE task, 80% of NMT segments needed human intervention to correct accuracy and terminology mistakes, constituting a major challenge for consistency not only within the document, but also with materials already published. Furthermore, this level of intervention required linguistic expertise in the specific sector to detect the specific mistakes concealed by the fluency of NMT output, mainly for the high risk associated with the use of NMT in the legal sector.

These findings are supported by a similar study on the use of eTranslation in the Slovene language department of the DGT (Arnejšek and Unk, 2020). The study found that only experienced linguists can ensure the required high quality in eTranslation PE for the European Parliament. Furthermore, the study's findings support other key aspects, including the necessity of training in specific skills for PE, a deeper comprehension of NMT behaviour, and recognition of potential errors and pitfalls in the use of NMT for the specific language combination and sector (as reported by do Carmo, 2020). Exploring the consequences of well-known NMT error types (previously identified in a corpus analysis) during professional PE is the focus of a research project performed in the German language department of the DGT (Vardaro et al., 2019). The research provides a foundation for subsequent studies that aim to monitor the PE activity of various "translation expert(s)" terms that "encompass translator, post-editor as well as revisor" (ibid p. 1) in a workflow that combines CAT tools and MT. The objective of this workflow is to identify the skills and training needs of professional and trainee translators.

However, the risks associated with the enhanced fluency of NMT are not the only concerns that arise from the uncritical use of such technology. Canfora and Ottmann (2020) defined three areas of risk: on the end user side, due to unidentified NMT errors (i.e. accuracy, omission, mistranslation etc.); on both client and post-editor sides, due to the absence of liability of the machine, because AI is not a legal subject and from a legal point of view, responsibility can be referred only to "human behaviour" (EC, 2018, in Canfora and Ottmann, p. 62); on the client side, due to potential exposure of sensitive data when free online NMT engines are used. The suggested solution is the creation of a sustainable workflow to the benefit of all stakeholders, as proposed also by Moorkens (2020b) "[s]ustainability has long been promoted by the United Nations (UN General Assembly 2015), and the notion of sustainable work systems links to UN Sustainable Development Goal 8" (ibid p. 13). According to

the perspective outlined by Canfora and Ottmann, a sustainable workflow that reduces risks for users and data protection should be: "beneficial for all agents, e.g. companies/clients, PMs, employees, TSPs and translators" (ibid p. 71); based on a long-term approach; assigned to experienced translators; and have "a just balance between control and trust" (ibid p. 71). The idea of "sustaining the disruption" introduced by MT was already proposed by Kenny (2018) who proposed "augmented translation" advanced by Lommel (2017) as an alternative to taking refuge in high-end customers, a potential solution to improve translators' perspectives toward the use of NMT positioning "human at the core". Within an augmented translation workflow "the human translator is presented not at the end of the translation chain, fixing errors in MT output, but rather at the centre of translation activity, drawing on key technologies—including adaptive NMT—that amplify his/her abilities and speed up the process of translation" (Kenny, 2018, p. 66). As already noted by Moorkens (2017) too, the integration of MT into CAT tools dims the boundaries between MT output and TM leverage. In order to investigate this convergence between MT output and TM leverage, "it is relevant to explore, through both controlled experiments and real-life case studies, how translators are actually working with NMT and TMs" (Ragni and Vieira, 2021, p. 14). Farrell (2023), in a survey conducted among professional translators, reported that a large proportion of respondents who declared that they used MT regularly stated that they preferred to use it integrated with CAT tools to perform "hybrid post-editing; using MT engines as if they were dictionaries; and using MT for inspiration. The vast majority of MT-users see MT as just another tool that their clients do not necessarily need to be informed about" (ibid, p. 1). In the context of the Ministry of Justice, the integration of TMs, TBs, a customised NMT engine and some automation features of CAT tools (Section 5.1) was aimed at enabling participants to adapt the tools to their skills and needs, and to compensate for the steep learning curve of translation technologies.

The idea that PE and NMT should be planned in a more comprehensive way, taking into consideration the whole translation workflow and all the stakeholders involved in the process, is developed also by Nitzke et al. (2019). In this research, the authors propose a decision tree model, to manage the risks related to the use of NMT in a translation project considering various aspects (i.e., time available, text type, required quality, scope etc.). They also introduce a PE competence model, to define the skills needed by translators to work as post-editors: it "unifies four core competences (risk assessment, strategic, consulting, and service competence) and eight sub-competences (bilingual, extralinguistic, instrumental, research, revision, translation, MT, and PE competence)" (ibid p. 252). In accordance with the idea expressed by Pym (2019), Nitzke et al. (2024) underline the importance of the linguistic authority of post-editors in risk evaluation, because even if decisions are usually made by customers and PMs, the specific post-editor competences are required to minimize the risks related to the use of NMT in a specific translation project.

2.6 Translators' attitude, social perception and technology acceptance

In accordance with the growing recognition of the pivotal role of translators' competencies and resistance in the advancement of MT, Läubli and Orrego (2017) offer an alternative viewpoint on translators' stance towards MT in their study: instead of gathering data with formal questionnaires, interviews and focus groups, they rely on a qualitative analysis of posts on social media like Facebook and LinkedIn. In order to ground the initial findings empirically, they used software for automatic sentiment analysis on larger data set of tweets extracted from Twitter. The assumption is that communications through these systems are less time consuming, more direct and spontaneous compared to formal questionnaires and interviews. The purpose of the research was to fill a gap in the investigation of professional translators' perception, and thanks to the interactions on social media, highlight the different attitude of translators and researchers towards MT. The findings of the study indicate that professional translators should have a greater influence on the development of translation technology. One of the three recommendations they give to fill this gap is "For translators to have an active role in the development of the technologies they (have to) use, it is necessary for both sides, professional translators and researchers, to meet halfway and cooperate" (ibid., p. 68). Despite the suggestion of common spaces on social media as a potential solution, current workplace research represents an additional domain in which researchers and translators can collaborate to share opinions and experiences and thereby address this gap.

The results obtained by Läubli and Orrego are corroborated by the research performed by Sakamoto (2019). In fact, Läubli and Orrego demonstrate that the prevailing negative opinion of MT among translators is not only related to quality, but also to the lack of transparent standards (in terms of remuneration, expected productivity increase, evaluation criteria, etc.) for PE and the unclear job profile and characteristics of a professional translator. Lack of transparency in processes and task description is also reported as a main source of translators' dissatisfaction by Rodríguez-Castro (2024). In accordance with Sakamoto's analysis, the reliability of evaluation campaigns employed to verify the efficacy of MT improvements is questionable, primarily due to the presence of biased methodologies within the evaluation process; MT output can replace only non-professional translators; and MT is used as an aid by poorly-skilled professionals. Sakamoto deepens the research related to the description of MT, translators and post-editors provided by various LSPs in the UK through websites, job descriptions and job offers, and the impact of such ideas on sociological aspects of human-machine relationship using Bourdieu's concepts of capital, field and habitus. In general, the research reports that 39 companies' websites reflect a negative image of MT, while PMs showed a negative perception of PE describing it as a boring and low-paid task. According to Bourdieu's principles, there is a battle on the field of the translation industry between translators and post-editors whose *cultural capital* (the skills and experience required to be good translator or post-editor) is not recognized and fairly paid by clients simply because the *habitus* (an attitude originating from the expression of the cultural capital possessed by a person in the field) is still to be recognized at the social level. The fundamental idea introduced by this research is that the lack of shared

guidelines and standards related to the correct use and payment of PE activities negatively affects the human-machine relationship and compromises the spread and proper use of MT.

In Section 1, we discussed the relevance of professional training, as researched by Vieira and Alonso (2020), who investigated the use of MT in a professional environment. This research emphasises the collateral problems that arise from introducing PE into traditional translation workflows, such as communication issues. It also highlights how negative perceptions of PE among translators, which are often influenced by external factors rather than personal experience, can have a detrimental effect on successful outcomes. However, with practice and training, these negative perceptions can be improved.

The perception of MT by translators was found to be a crucial factor in its acceptance, as demonstrated by Rossi and Chevrot's (2019) workplace research in the French language department of the European Commission. Their approach appeared to be the most suitable for addressing the second RQ due to the similarities between the working environment and working conditions of the Ministry of Justice: the translators at the DGT and the Ministry of Justice are granted “relative job security, recognition, and a freedom not typically enjoyed by professional translators in other settings” (ibid., p. 329). Rossii and Chevrot’s study aimed to evaluate the acceptance and use of MT and capture further details about the human factors involved in the interaction between translators and MT, based on the principles outlined in Cadwell et al.'s (2016) research. Other studies were found to be less useful as they mainly focused on university students or lay users and utilized free online MT engines.

In his research, Vieira (2020) wants to analyse whether translators’ negative attitude to CAT and (N)MT is due to technology itself or to the market effects generated by the misuse of technology in the translation industry. In a detailed literature review, the author lays the foundations for his assumption reporting how disruption introduced by technology has always caused major resistance in society due to job loss. He also remarks that recent scholarly works focus on the translators’ attitude toward the impact of automation on translation process and products, disregarding the effects of technology on rates and pay.

Further confirmation of research trends in this field is provided by the analysis performed by Ragni and Vieira (2021). The research related to the role of humans in translation projects involving the use of NMT is still focused on technical improvement and optimization of MT as a substitute of translation work. The proposal for future research is to investigate the use of NMT as a tool to help professionals (as it happened with CAT), preferably in real-life scenarios with empirical experiments with professional translators. Lambert and Walker (2022) presented the results of a study about rate-setting in the translation industry of the United Kingdom and confirmed that "translators feel under threat from disruptive technologies, Uberisation, and non-professional translation, now more than ever" (ibid., p. 277).

2.7 Concluding remarks

This chapter has presented a critical review of the research conducted over recent years on the impact of the rapid and overwhelming development of translation technologies on professional translators, focusing specifically on the human factor and the interaction between human and machine. Despite the great potential of neural networks, linguistic data produced by humans are critical for MT engine training.

A brief overview is given on workplace research in TS as a new field of investigation. Ergonomics and, above all, social interactions emerge as important elements to fully understand the translation process, taking into account not only the technical aspects but also the cultural and social dynamics, despite all the difficulties related to field research (Ehrensberger-Dow and Massey, 2019).

After analysing how the interest of the researchers shifted from the performance of translation technologies to the relevance of the role of translators for the implementation and the development of such technologies, I analysed the main topics, the scenarios, and the methodologies adopted in order to identify the research gaps and some useful suggestions to define my investigation methods. One of the first elements that I identified is the conceptualisation of the end-user of NMT, which should include translators among other users that exploit the advantages of automatic translation. Linguists should not only be considered as evaluators, but also as technology users, with a particular focus on their user experience. Translators should become active players, and their satisfaction and motivation in the use of such technologies should acquire new momentum.

Among the different methods and theories applied to the study of translators' satisfaction, the instrument developed by Rodríguez-Castro (2015) seemed the most appropriate for my workplace research, since it includes various aspects of the job (tasks performed, work environment, personal relationships, etc.) and is flexible enough to be adapted to the specific characteristics of this study.

Together with satisfaction, Rossi and Chevrot (2019) focus on translators' perception as a fundamental element influencing the acceptance of MT. Sakamoto and Yamada (2020) report on the relevance of social agency and translators' attitudes towards the new translation tools, suggesting the adoption of a bottom-up approach to let the human factor prevail over the technology. The translator's linguistic experience is essential to authorise the use of MT (especially in fields such as law or medicine) and to prevent its inappropriate use. Do Carmo (2020) also emphasises the importance of training to facilitate the acquisition of a good level of familiarity with the specific capabilities of the tools used to carry out a job (especially MT engines), in order to maintain full control of the whole process. In addition, Vieira and Alonso (2020) focus their study on the importance of adapting the translation workflow particularly when introducing PE into the work environment, and on the complexity of research in a real work environment. In their study at the DGT, Cadwell et al. (2016) investigate the impact of human factor and the attitude of translators towards PE.

Stefaniak (2020) brings to light another relevant issue related to the use of NMT: the fluency of MT output makes it more difficult to detect errors, so productivity gains must be sufficient to justify such risks to quality. Not all subjects or domains are suitable for NMT and linguistic expertise becomes even more important (Vardaro et al., 2019). Augmented translation (Lommel, 2017) could be a solution to adopt a sustainable workflow (Canfora and Ottmann, 2020) to reduce risks and keep control of NMT output, integrating MT in CAT tools (Farrell, 2023).

The following chapters will present the findings of a study investigating the impact of a participatory approach to the introduction of translation technology in an institutional setting: “translators ought to be included in the change process from the very beginning […] efforts could be made to increase not only translators’ sense of agency but also their actual level of agency, rather than allowing them to feel that the material agent gets precedence and is inevitable” (Cadwell et al. 2018, p.317). The study places particular emphasis on the design of the training phase and the conduct of workplace research, with the objective of ensuring ecological validity and aiming towards sustainable translator-machine interaction.

Chapter 3 Theoretical framework

3. Introduction

The areas for further investigation related to the human factor in translation technologies (Figure 2.1) identified in the literature review (Section 2.2.1) were selected as the starting point for the planning of the present research. In this study the dependent variables are the sources of (job) satisfaction/dissatisfaction, the sources of (job) motivation/demotivation and the attitude (to translation technologies). For the sake of convenience, the first two dependent variables will henceforth be referred to as *(job) satisfaction* and *motivation* throughout the remainder of this thesis.

Satisfaction is understood in accordance with the definition provided by Rodríguez-Castro, who posits that satisfaction can be experienced at various levels (professional, social, financial, personal, etc.) due to its intrinsic relationship with "the positive attitude that an individual derives from the work itself […] in conjunction with the multidimensional contextual aspects that affect individual work behaviour" (2015, p. 32) (Section 3.4). *Motivation* is defined according to Herzberg's two-factor's theory (1987) who evidenced how the primary motivating factors are not external but intrinsic, stemming from the value and fulfilment gained from one's work. Consequently, for an individual to be effectively motivated, their role should present challenges, opportunities for growth and development, and a sense of relevance to them as an employee. He defined "motivators" as the factors directly influencing an individual's satisfaction derived from their role (Section 3.5). *Attitude* is understood as a feeling about a specific object or behaviour (Ajzen, 1991; Lai et al., 2022), specifically participants' perceptions regarding the utilisation of technology, and it is analysed according to the perspective of Rossi and Chevrot (2019) that integrates the principles of technology perception, IT fear and technology acceptance models (Section 3.6).

The dependent variables were analysed against the independent variables that, according to the extant workplace research examined in Chapter 2, represent factors that have a significat impact on them: agency, autonomy, linguistic authority, participatory approach, augmented translation, training and mentoring. Figure 3.1 represents an overview of dependent and independent variables.

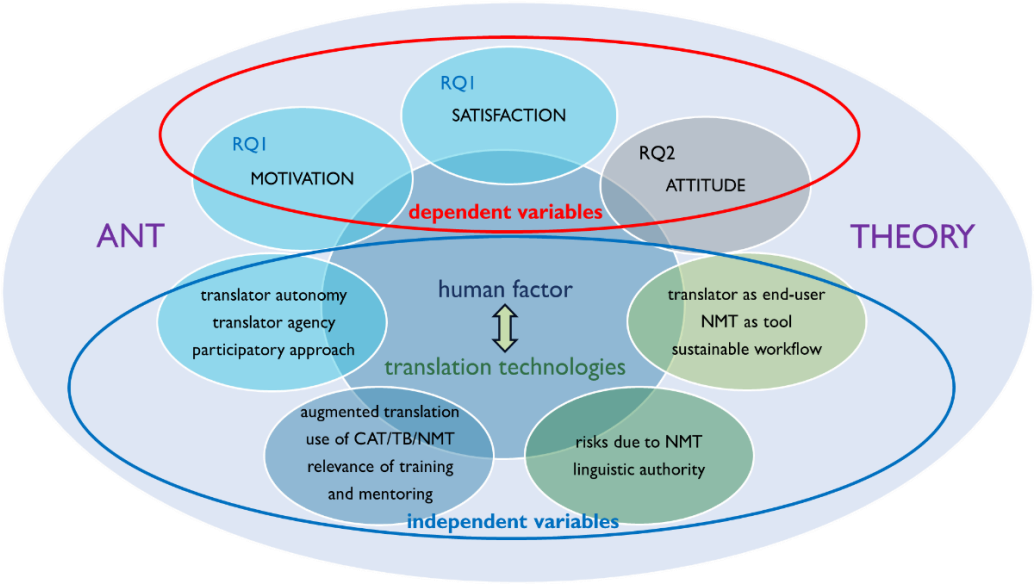


Figure 3.1 Framework of the present study

This chapter will present the theoretical framework within which the research was conducted. In view of the complexity of the interconnected factors to be investigated from a multifaceted perspective (i.e. personal, professional, technical, social, etc.) in the workplace, flexibility and adaptability were identified as two fundamental aspects to be considered. Following an introduction to the rationale for adopting a participatory approach (Section 3.1), and the relevance of translators' agency (Section 3.2), I will present the core concepts of ANT, the theoretical framework that underpins the social perspective of the study. I will explain why this theory was deemed to be the most appropriate for the Ministry of Justice context and describe how the key concepts of this theory have been adapted to the specific context of the present research (Sections 3.3). In Section 3.4, the construct by Rodriguez-Castro will be described as a basis for defining job satisfaction, while Herzberg's theory (Section 3.5) will be used to define motivation in the present study. Attitude will be evaluated only in relation to translation technology acceptance (Section 3.6), using the constructs at the core of one of the most used models of IT adoption, the technology acceptance model (TAM), adapted in accordance with the perspective suggested by Rossi and Chevrot (2019). Section 3.7 is dedicated to the concluding remarks.

3.1 Research in the workplace: from product to producer

Researching real-life scenarios, particularly in the workplace, has advantages and disadvantages to consider. The penetration of translation technologies in the translation industry has prompted technology developers and LSPs to perform and sponsor in-situ research. This research mainly enrols groups of translators and project managers as beta testers to optimize new tools and translation workflows. As reported by Ehrensberger-Dow and Massey (2019), translation technology has led to a significant increase in productivity, reducing time to market for translations. However, these technologies, particularly MT, have the potential to negatively impact the translation process

and may pose challenges for translators (O'Brien et al., 2017; Cadwell et al., 2018). Consequently, both productivity and quality may be adversely affected.

This is one of the main reasons why in recent years, research has focused not only on the product but also on the translator, examining both the results and the process, from the laboratory to the workplace. This approach recognises the importance of the translator as an individual, rather than solely focusing on the translation itself. Although planning and operationalizing a replicable research study in the workplace may be more challenging, investigating the deployment and usage of translation technologies in a translator's typical working environment is crucial to understanding how such tools can affect translation performance. This approach allows for the gathering of information that cannot be reproduced in the controlled setting of a university laboratory. For instance, Ehrensberger-Dow (2014) in a workplace study conducted with the internal translators working in an LSP, focused on one of the reasons that suggested the adoption of a bottom-up approach in this research: "Nothing like this had emerged in the lab processes […]. It is difficult for translators to come up with new, potentially very good solutions to translation problems if they are supposed to find and use existing solutions first" (Ehrensberger-Dow, 2014, p. 375). Once participants have familiarised themselves with technology, the participatory/bottom-up approach (Section 4.11) could enable them to utilize their expertise and agency to propose innovative ways of adapting existing translation tools to their working environment, according to the specific needs that arise in their day-to-day work for each specific task they have to perform. "If translators are unnecessarily constrained by the tools they are using and the system that they are working in, then it will be very difficult for them to demonstrate the adaptability and flexibility that is expected of them as professionals" (Ehrensberger-Dow, ibid, p. 379), and this could potentially increase their reluctance to accept new technologies.

3.2 Agency or "the power to originate action"

The participatory approach applied in this research is intended to ascertain the relevance of independent variables such as translators' agency and autonomy in choosing whether to utilise translation technologies and which specific tools to employ (Cadwell et al., 2018). Ehrensberger-Dow and Massey (2017) posit that without self-determination and decision-making, there is no commitment or sense of responsibility to the technological change (Sections 2.3 and 2.3.1). According to Hora et al. (2018), job satisfaction is closely related to the motivation to accept new challenges at work. Bandura (2001) defines self-efficacy as the "power to originate action" (ibid p. 3), which is closely related to agency. In social cognitive theory, agency represents an individual's ability to control their cognition, behaviour, and motivation through self-efficacy (Bandura, 1986). Kinnunen and Koskinen (2010) provide a more recent definition of agency in TS as "the willingness and ability to act" (ibid p. 7), and "to understand agents, one needs to look at the structures they are located in and vice versa" (ibid p. 8). In particular, they focus on: "willingness […] a particular […] state […] linked to consciousness, reflectivity and intentionality"; "ability relates the concept of agency to constraints and issues of power(lessness), highlighting the intrinsic relation between

agency and power"; and "acting, that is, exerting an influence in the life-world" (ibid pp. 6- 7). Kotan (2010) suggests that agency is linked to satisfaction and defines a human agent as a person "having the ability to exert power so as to influence the state of the world, do so in a purposeful way and in line with self-established objectives" (p. 370). Similarly, Buzelin argues that agency is "the ability to exert power in an intentional way" (2011, p. 7).

The present study examined agency as a potential source of satisfaction and motivation. Specifically, it investigated the power of participants to promote technological change, to adapt tools to their own needs, and to exert linguistic authority in the adoption of translation technologies as part of the decision-making process in their work environment. Another key element of the process (Section 5.3) is training and mentoring to help participants become familiarised with translation tools. The workplace context of the Ministry provided the opportunity to analyse agency also from a social perspective in the framework of ANT (Section 3.3).

In fact, as translation is also examined sociologically in TS, the focus on agency has shifted towards social factors related to translation activity (Angelelli, 2012; Wolf, 2012). Abdallah (2010) investigates how translators perceive agency, considering factors such as "accessibility of information, cooperation, quality of the working process and the product, salaries and fees, and translator role and status" (ibid, p. 18). According to Abdallah (2011), agency is derived from dynamic relationships created among human and non-human actors in a working environment. In her empirical study involving eight professional translators, Abdallah (2014) analysed the changes in their agency over six years, adopting this principle. Melby (1995) argues that agency is the main element that characterizes human beings: "Without this interacting agency, there is no responsibility, no empathy or indifference, no blame, and no gratitude. […] Without agency, we are reduced to the status of machines and there is no dynamic general language. Without dynamic general language, we would translate like computers and there would be no truly human translation as we now know it. Thus, lack of agency is one factor that keeps computers from translating like people" (Melby, 1995, p. 9).

This poses the problem of the new role played by translators as active or passive players. Forcada (2017) reports of NMT that for "the potential of this technology to be fully realized in professional translation, the involvement of professionals is crucial" (Forcada, 2017, p. 291). The study conducted by Cadwell et al. (2018) is noteworthy for its approach to examining the relationship between humans and machines. The study's novelty lies in its analysis of results within the framework of Pickering's (1993) 'dance of agency' model, as suggested by Olohan (2011). The researchers identified four primary reasons for using this model to comprehend the interaction between translators and MT: the dual agency dance, the growing development and dissemination of MT technology, the "introduction of MT as a technical rather than socio-technical change process" (Cadwell et al., 2018, p. 316), and the goal of shifting the focus from human to material agents. The researchers begin by discussing the latest studies on PE, which demonstrate that MT does not hamper the translation process and

does not significantly affect the quality of the final translation (Gaspari et al., 2014; Teixeira, 2014; Moorkens et al., 2015). As a result, they aim to investigate why translators are hesitant to use MT as an aid in their work. The assumption is that the issue should be investigated in the relationship between human and machine, that is in the mechanism according to which human agents (translators) try to exploit the material agent (MT) to influence the actions of other human agents (i.e., double dance of agency).

The objective of this approach is to shift the focus away from human agents and towards the material agent. Human agents and material agents influence each other through a complex mechanism based on the use of TMs. Developers use TMs created by translators to train MT systems. This conditions human agency in translation processes, as translators have to post-edit the output of the engine trained with linguistic data of an unknown and potentially unreliable source (changing as little as they can in order to best exploit MT). The machine requires the linguistic expertise of human translators for training but at the same time it limits the creativity of translators during PE of MT output to fully utilise the engine. The participatory approach promoted in the present study is designed to prevent such a scenario, enabling translators to retain complete control of linguistic data from the outset of the process. This is accomplished by providing the requisite skills through training and fostering confidence in technology through mentoring. They are responsible for selecting the documents to be used in the creation of TMs and TBs, determining how to address inconsistencies in linguistic data, evaluating the output of the trained engines, and determining when it is appropriate to utilise TMs in conjunction with NMT or not (Figure 3.2).

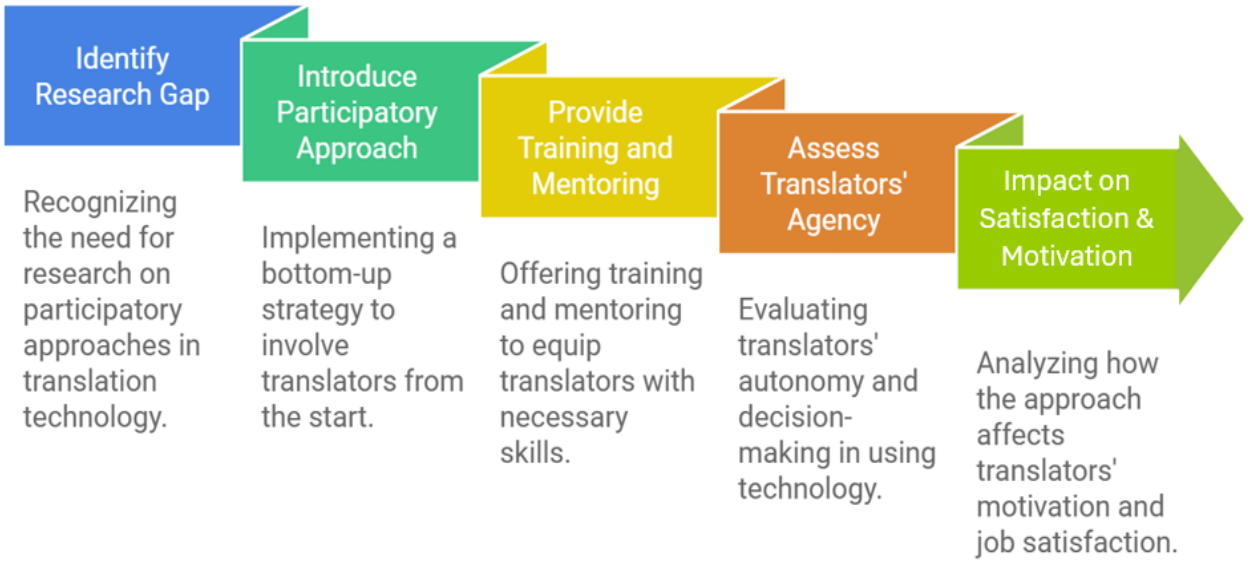


Figure 3.2 Participatory approach in the present study

Cadwell et al. (2018) conducted research using a purposive sampling method. The participants who volunteered to participate in focus groups worked at the DGT and in a language service provider called Alpha CRC. The collected data confirms the initial assumption that, under certain

circumstances and conditions (mainly related to the type of text to be translated and the language pair), translators find MT useful and helpful in producing quality translations.

However, the most significant finding of this study is that the two cohorts exhibit different abilities in selecting the conditions under which they use MT. One of the reasons for this difference is the varying levels of involvement of translators in the implementation and development of MT. DGT translators have the opportunity to provide feedback to the editors of the source texts to be translated, as well as to the engineers who develop and train the MT engine. As a result, users tend to trust the machine and the process more when they are involved in the whole development process. However, Alpha translators report feeling overwhelmed by MT and only marginally involved in its development and implementation, leading them to trust TMs more than MT. Heinisch and Lušicky (2019) published a case study demonstrating the importance of using data for training MT engines to confirm or disconfirm user expectations of MT output quality. The study found that user confidence in the quality of MT output influences acceptance and future use of MT.

3.3 Workplace research and ANT

In this study, the interactions between translators and technology are described using ANT, drawing from researcher field notes, allowing the consideration of both human and non-human agents in the network dynamics to examine the impact of each element's agency (whether it be the translator or translation tool) on the organisational system. Latour (1996, 2005) argues that ANT focuses on the constantly evolving relationships between the elements that make up the network, and the changes in these relationships constantly regenerate the system. This theoretical framework is suitable for investigating the impact of translation technologies in the Ministry of Justice's translation department. It considers not only the human factor but also cultural and technological aspects, their reciprocal agency in the working environment, and the resulting effects on the organisational system.

A recent contribution in workplace research in TS is the combination of ANT concepts and the socio-cognitive approach proposed by Risku (2017, 2020) to enhance the potential of ethnography in empirical research. According to Risku et al. (2020), this method is applicable in workplace investigations where the focus is on examining translation as "a process, product, service and industry", that affects and is affected by "cognitive, technological and social factors" (p. 41). They highlighted the increasing focus on sociological perspectives in recent years, borrowing elements from the sociology of work and organisational ergonomics. This research examines the impact of professional translators' working environment on their performance. It focuses on their agency, professional status, working routines, and social dynamics. As previously mentioned, the proliferation of translation technologies has significantly impacted the working conditions of translators. They are increasingly involved in relational networks, whether they are in-house employees or freelancers. In this context, ANT has proven to be a valuable theoretical and

methodological tool for examining changes and developments in the network of social interactions between actors in their typical work environment.

3.3.1 ANT: key concepts

ANT is a theoretical framework developed by technology scholars Bruno Latour and Michael Callon in sociological and anthropological contexts and applied to organisational studies in the early 1980s (Callon and Latour, 1981; Callon, 1986). The aim of these scholars was to propose a new social theory that could be useful for studying scientific and technological fields. ANT does not propose a predetermined order or assumption, it only provides a tool to trace associations, which is why it is also known as the "sociology of associations" (Latour, 2005, p. 9). However, networks do not exist as entities per se, but emerge as the study progresses. ANT offers a distinctive lens for analysing the social world.

According to ANT, the social is constructed through ongoing interactions and associations between various *actors*, including humans (such as scientists, politicians, and engineers), non-humans (such as technologies, diseases, and natural phenomena), and even ideas. ANT is based on a large number of concepts, but the present study focuses only on those that are most relevant to the phenomena under study (Table 3.1).

The concept of an *actor* in the *network* defines the role of an *actant*, which is an entity that is a source of action. ANT conceptualises the social world as a dynamic web of interconnected actors forming *actor-networks*. These networks are not static, they are characterised by constant interaction and influence between actors. For instance, a translation tool network might include the tool itself, the engineers who designed it, the software that controls it, the linguistic data it interacts with, and the translators who use it.

The connections and relationships formed between actors within a network are termed *associations*. These associations can be collaborative or antagonistic, strong or weak. Crucially, actors within a network engage in a process of *translation*, negotiating meaning and capabilities to establish these associations. Translation^{ANT} (hereafter referred to as translation^{ANT} to distinguish it from the traditional concept of translation) is a key concept in ANT: it involves conveying information, aligning interests, and ensuring a shared understanding to manage the network. Translation^{ANT} is a four-stage process that leads to the creation and evolution of networks: *problematization*, *interessement*, *enrolment* and *mobilization*.

Problematisation refers to the moment when an issue or hitch arises within the network, prompting actors to take action. For example, a series of errors resulting from the use of a particular NMT engine could lead to a problematisation of quality within the network. *Interessement* is a process by which the *speakers* (allies who are authorised by the enrolled community to speak and act on behalf of other actors) attempt to involve other actors in the action. In response, actors may engage in *mobilization*, marshalling resources (material, social, symbolic) to address the problem and ensure

the network's continued operation. The success of an actor-network depends on *enrolment*, the process of recruiting new actors and securing their participation, "multilateral negotiations, trials of strength and tricks" (Callon, 1986, p. 211) aimed at getting actors to accept the roles assigned. Actors become enrolled when convinced of the network's benefits and contribute their resources towards its goals. "*Inscription* is the result of the translation of one's interest into material form" (Callon, 1991, p. 143). Inscriptions are commonly used for procedures, process standards, regulations, or software requirements documentation. Inscriptions are used to achieve successful alignment between actors. They indicate how the network should operate and support the translation^{ANT} process by designing the network and determining who will participate, how they will participate, and the influence on their roles. For instance, after establishing and automating business processes, the supporting software takes on an inscription role that can become fixed and irreversible. This makes it impossible to restart the process or consider alternative opportunities. The *obligatory passage point* (OPP) is an element within the network that all other actors must interact with or a situation that must occur, for all actors to achieve their agreed-upon interests.

Once actors are enrolled and their meanings inscribed, ANT acknowledges a degree of *irreversibility*. Dismantling the network becomes more difficult as actors become reliant upon each other and the inscribed meanings. Furthermore, some elements within the network may evolve into *immutable mobiles*, which are entities that become fixed and difficult to change due to inscription. If the software code controlling the translation tool becomes highly complex and resistant to modification, it could become an immutable mobile.

Actors within a network may not always be able to directly communicate their interests. The concept of *speaker/delegate/representative* acknowledges that actors may rely on others to represent them or convey their interests within the network. However, the possibility of *betrayal* exists. This refers to an actor within the network acting in ways that disrupt the network or go against its goals. If the translation tool fails to manage a particular file format this could be seen as a betrayal, as it disrupts the network's intended function.

According to ANT, translators are not seen as exclusive decision-makers, but as actors who are influenced by a network of elements present in the translation process. Actors aim to align their interests and enrol additional actors to increase the stability of the network. Through the analysis of these dynamics, ANT provides a detailed comprehension of how sociotechnical realities, scientific knowledge, and social phenomena are constructed by the interactions of actors within networks. However, Diedrich and Guzman (2015) note that translation^{ANT} cannot be identified as a single moment, but rather as a recurring process to produce stable networks while defining and redefining the identities and interests of the actors within the network.

3.3.2 ANT in TS

Over time, ANT has been used in TS to analyse the process of translation from a sociological perspective. ANT has become a prominent sociological approach within TS, especially as a result of the sociological turn in TS (Wolf, 2007), characterised by a shift from product-oriented to agent- and process-oriented studies. This development, as highlighted by Wolf, signifies a transition from studying only translation outcomes towards a more comprehensive understanding of the intricate networks and processes involved in translation activities. This new sociologically-oriented approach to TS was more focused on translators' agency and the social factors influencing translation activities (Toury, 1995; Angelelli, 2012; Wolf, 2012). Scholars such as Buzelin (2005) and Buzelin and Baraldi (2016) have played a crucial role in championing ANT within TS, shedding light on how translation unfolds in specific contexts and identifying the different actors that contribute to translation production.

Law (1997) noted how the 'power' of an actor in the network can be created by objects introduced into an organisation (e.g. a large office or a computer). The main concept of ANT is that any actor, human or non-human, added to or removed from a network (such as, in this specific case, translation technologies introduced in the Ministry of Justice) can affect the balance of the whole network, redistributing roles or affecting personal relationships as a "source of power" (ibid.). An ANT framework includes tracking and explaining the translation^{ANT} moments through which networks of aligned interests are formed and maintained, or investigating why these networks cannot be formed. Effective networks are formed by the enrolment of a set of allies who successfully translate^{ANT} their interests and are therefore well disposed to adopt specific ways of thinking and acting in order to sustain the network (Walsham, 1997). ANT examines "motivations and actions of groups of actors who form elements, linked by associations, of heterogeneous networks of aligned interests" (ibid. p. 468).

Although ANT has gained significant influence in TS, it has not been universally adopted in its entirety (Chesterman, 2006). Scholars, such as Luo (2020), argue that the full application of ANT concepts poses challenges, particularly in studies dealing with the introduction of new technologies (Cresswell et al., 2010). The nuanced and complex nature of ANT concepts makes it difficult to apply them fully in a single study, leading researchers to introduce certain aspects selectively. For instance, Luo (2020) recognises the limitations of relying solely on ANT and suggests integrating other theories or methods for a more comprehensive analysis. In TS, Risku and other researchers have addressed this complexity by strategically combining ANT with other theories or methodologies (see Section 2.2.1). This promotes a more holistic understanding of translation processes in different domains and explores the multifaceted nature of translation activities. In the present study, I am in agreement with the position expressed by Luo and Risku, namely that in order to obtain a multifaceted perspective of the phenomenon under investigation, it is necessary to combine ANT with other methodologies.

When ANT was first introduced in TS, it often coexisted with elements of Pierre Bourdieu's social theory (Buzelin, 2005). This combination of theories, which Buzelin calls 'unexpected allies', proves fruitful in uncovering the complexity of translation networks. While exploring the structural context of translation activities, ANT excludes subjective evaluations unless they are clearly marked as such. Bourdieu's habitus sheds light on individual translator practices that may deviate from established norms. Researchers have integrated various theories with ANT into their studies. For instance, Abdallah (2014a) traced translators' work paths over several years by intertwining Bourdieu's habitus with Latour's concept of agency, incorporating affective factors into the analysis. Notable projects include localising games in China (Zhang, 2015) and exploring translation tools used by translators in their daily work (Risku and Windhager, 2013). These studies demonstrate the versatility of ANT and highlight the importance of combining it with other theories to capture the complex dynamics of translation activities.

3.3.3 ANT perspective and technology adoption in complex organisations

ANT is a suitable method for analysing the agency and roles of individual actors, as well as the complex relationships between them which were identified as independent variables (Section 3.1). This is because it avoids assigning predetermined attributions, such as agency, to specific actors and does not differentiate between human actors and non-human entities. These characteristics make it the most suitable tool for capturing snapshots of transition moments in the evolution of an unstable and multifaceted network of actors, especially when technology is one of the actors.

Cresswell et al. (2010, p. 1) reported that in a study about IT implementations in healthcare settings, ANT "is conceptually useful in helping to appreciate the complexity of reality (including the complexity of organisations) and the active role of technology in this context". Cresswell (2019) confirmed that ANT is a useful approach for investigating the reciprocal effects of technology and human relationships within the socio-technical context of healthcare research. The study's results confirmed Mitchell and Nault's (2003) assumption that in complex organisational contexts, such as the Ministry of Justice, it is essential to consider the impact of technological, social, and cultural aspects on the outcomes of any technological innovation introduced and the performance of the personnel involved.

Some researchers have used ANT principles to examine the causes of non-adoption (or betrayal according to ANT concept) of certain technologies in complex organisations. Sidorova and Sarker (2006) used ANT concepts to investigate the sequence of events that led to the failure of business process reengineering in a large telecommunications company in the USA, identifying the causes of failure in errors at the problematisation stage and in the betrayal of some actors. Similarly, Rivera and Cox (2016) applied an ANT perspective to analyse the non-adoption of a collaborative technology to support online community participation in the human resources department of a multi-campus university in Mexico. They identified problems that occurred at the different stages of problematisation, interessement and enrolment, which disrupted the translations^{ANT} phase. These

studies represented a useful starting point in my study to define and analyse from an ANT perspective the negative attitude and the resistance showed by some participants during the whole process of deployment of translation tools.

Carroll (2014) exploited the potential of ANT in analysing the introduction of IT innovation in public services, where "it is inevitable that bureaucracy plays a central role" (Carroll, 2014, p. 120). The study was of particular interest to me in the context of my research project, as bureaucracy was a constant and pervasive factor that significantly influenced the timing of my study. Carroll referred to Weber's classical description of bureaucracy (1919), in particular for elements like "dictation of labour based on functional specialisation; a hierarchy of authority; a system of rules which limit discretion; impersonality; a career structure based on technical competence; written records of activities" (ibid. p 120). According to Carroll, ANT provides the researcher with a kind of "toolkit", a "vocabulary" to "understand how both social action shapes technology and how technological innovations shape social action […] to explore how networks are built or assembled and maintained to achieve a specific objective" (ibid. p.120). In light of the insights gained from this study, I am in complete agreement with Carroll's assertion that, within a bureaucratic setting such as a ministry, the ANT approach is the most suitable for investigating the sequence of actions undertaken by actors to attain the desired outcome, to transform their shared interests into action, and to highlight the unpredictable nature of human behaviour, where actions are not predetermined. The ANT approach does not incorporate a social dimension or social order. Consequently, the actions of actors are not constrained by a preordained social context (Latour, 2005). In the present study, this is of particular importance as it allows for the investigation of factors such as agency, autonomy and commitment of participants, whose actions are not limited by the hierarchical relationships imposed by job roles. "Actants have the ability to (re)construct a network with their interactions to stabilise the system. Of course, the reverse is also true, i.e. the lack of interactions can destabilise the network until it eventually dissolves" (Carroll, 2014, p. 123). This phenomenon is precisely what I observed when I initially engaged with the Ministry context: the division of the linguists' group into two distinct locations for organisational reasons had effectively dissolved some personal relationships that had been established up until that moment (Section 4.6). The research project represented the opportunity to recreate that network among all the participants.

One of the criticisms that has been made of the symmetry that ANT creates between human and non-human actors is that an inanimate element, such as a piece of software, cannot have interests. Initially, I was inclined to agree with this viewpoint. However, an analysis of the various applications of ANT to fieldwork studies revealed that the explanation proposed by Latour (1992) is a compelling one. According to this explanation, the interests of an artefact can be compared to the interests that have been inscribed in it (i.e., translation technologies have the interest of helping translators in their daily activities, which has been inscribed by the engineers who created them).

Zein and Twinomurinzi (2023), for example, adopted the ANT approach to investigate the process of implementing blockchain technology in the Sudanese government's land registration system. This environment shares numerous characteristics with the Ministry of Justice, particularly in terms of its complex internal organisation. They found ANT to be the most appropriate tool for their case study, which aimed to explore and represent the evolution in the social network, from the creation of patterns, social rules, and resistance in a government context. According to ANT, there is no need to distinguish between micro (i.e. individuals) and macro (i.e. organisations) actors, but it does recognise the inherently dynamic characteristics of actors (Latour, 2017). This is particularly important in contexts such as a public service, a government, or a ministry, as this flexibility allows a socio-technical collective to be studied either as a unified actor or as a collection of individual actors, depending on the desired level of analysis (ibid.). Latour provides a justification for treating both entities symmetrically, pointing to the growing uncertainty about whether digital technologies represent a restricted version of an organisation or whether the organisation is an extended form of digital technology (ibid.).

3.3.4 ANT in the present study

The above-mentioned studies were a source of inspiration for integrating ANT with other theories and implementing it in the workplace. In the present research, ANT was used according to Carroll's perspective (2014): a kind of toolkit that could help the researcher to study and understand how "social action shapes technology and how technological innovations shape social action", taking into account the complex network of power relations and interactions that affect the work environment and the translation process. ANT is an analytical framework to describe the complexity of the Ministry working environment and provides a set of terms and concepts that are useful for this purpose. It is important to note that ANT does not have "[p]redictive power [..] the ability of a theory to prospectively predict a phenomenon under investigation" (Cresswell, 2019, p. 90). This peculiarity was also clearly pointed out in various occasions by Latour (2017), Law (2009), and Callon (1986). Law (2009) further clarifies that ANT provides a toolkit for describing how networks are created or disrupted by relationships but cannot explain the cause of the phenomenon being analysed.

ANT implies the study of the different actors involved in translation^{ANT}, their interactions, and the influence of power relations on the flow and outcome of the translation^{ANT} process. The application of its principles was useful in gaining a holistic understanding of the complex working environment of the Ministry of Justice and the profound impact of the introduction of translation technologies on workflows, the internal organisation of tasks and personal relationships. From a longitudinal perspective, the recurring nature of the translation^{ANT} moments and the potential instability of the multifaceted network of actors, which tended to achieve only temporary stability, as they were mainly characterised by fluidity and constant change in relationships, especially when technology was one of the actors, represented an additional opportunity more than a disadvantage.

Firstly, the linguists' extensive professional experience, spanning over 25 years, has been characterised by the development of bespoke procedures rooted in their own IT proficiency, the tools at their disposal, and the formats and methods of translation delivery (Section 4.6). Secondly, it is important to consider that the Ministry is a reality that has remained completely isolated from the trends and developments in the adoption of translation technologies. The rigid internal hierarchical organisation, coupled with frequent changes in department heads, has made it difficult to introduce new procedures that require long and complex approval processes. This has helped to consolidate working habits that are functional to the Ministry's timetables, quality, and security requirements, thus slowing down technological innovation. These linguists have been working in the same role at the Ministry for many years and possess valuable historical knowledge that ensures linguistic continuity. Their expertise allows them to evaluate proposed changes quickly and objectively. They can suggest changes to senior management based on their linguistic and technological knowledge.

Although agnosticism is one of the three tenets of ANT, along with symmetry and free association (Callon, 1986a), this approach enables the analysis of the role of the researcher as an actor involved in the creation, reconfiguration or dissolution of a network. According to the principle of agnosticism, researchers should allow actors' experiences to emerge through their own voices, without any censorship or pre-determined roles imposed upon them. This method is especially valuable for examining how participants' satisfaction and motivation change as associations are formed or dissolved to achieve agreed-upon objectives. However, agency does not always imply intentionality (Law and Mol, 2008). Latour (1992) specifies that non-human actors have agency to create relations and translate interests, but entities are not automatically attributed with agency unless they have an impact and leave evidence of their actions (Latour, 2005). Agency is not an intrinsic or immutable quality, as it is the outcome of dynamic relations between entities and must be studied empirically in a specific context.

Cresswell (2010) states that the researcher is part of the network because, from an ANT perspective, "humans are both informants (i.e. actors that generate accounts) and interpreters (i.e. the researcher as interpreting associations and components of the network)" (ibid., p. 8). The notion of complete detachment is challenged by the notion of the researcher as an integral part of the network; true detachment would be implausible given the researcher's inherent temporal and spatial positioning, which necessitates an active role in eliciting and constructing ANT accounts. The aim of ANT is to study "how networks come into being, to trace what associations exist, how they move, how actors are enrolled into a network, how parts of a network form a whole network and how networks achieve temporary stability (or conversely why some new connections may form networks that are unstable)" (ibid., p. 8).

Table 3.1 describes how the selected ANT concepts were adapted in the present research:

Concept	Description	Adapted in this research
Actor	"Any element which bends space around itself, makes other elements dependent upon itself and translates their will into the language of its own" (Callon and Latour, 1981; p. 286)	Human: linguists, heads of departments, IT personnel, researcher Non-human: translation technologies, computers
Actor-network	A heterogeneous network of aligned interests formed through translation of interests (Walsham and Sahay, 1999).	Human actors + non-human actors
Associations	Non-social ties which can be used to trace associations and does not designate a thing among other things.	A continuous evolution involving two or more actors at different stages: researcher + IT staff + head of department + translators
Focal actor	The key actor who 'interests' and 'enrols' other actors to gather their support for a change initiative (Abdallah, 2011).	Person who leads the change process (some linguists and researcher)
Translation	The successful alignment of the interests of a diverse set of actors with the interests of the focal actor by encouraging one another towards the pursuit of self-interest and collective objectives. Translation is a process that creates a temporary actor-network through four main phases (Callon, 1986a): 1. Problematisation 2. Interessement 3. Enrolment 4. Mobilisation.	Alignment of the actors' interests with the interests of focal actor and translation technologies through reorganisation of translation workflow. Each actor addresses the effect of introducing TMs, TBs and NMT in order to support daily work, during the whole research project, from enrolment in the research project, through training, mentoring, implementation of a new workflow, to submitting a request to buy licences for the tools
Problematisation	First moment of translation: a focal actor determines the identities and interests of other actors that coincide with its own interests (i.e. obligatory passage point) and defines the nature of the problems or opportunities to be solved in the network. The common problems lead the actors to align their interests with the network.	The moment of defining how translation technologies could help linguists cope with increasing workloads
Obligatory passage points (OPP)	A situation that has to occur in order for all the actors to satisfy the interests (Callon, 1986a).	Install the programs on all PCs, learn how to use translation technologies, explore potential and limitations with legal documents
Interessement	Second moment of translation: actors are convinced to agree on and share the interests of the focal actor (Callon, 1986a)	Some linguists promoting the research project first and researcher then described how translation technologies could be adapted to Ministry of Justice translation process
Enrolment	Third moment of translation: An actor accepts the interests defined by the focal actor and sets out to achieve them through actant allies which align with the actor-network (Callon, 1986a)	All the linguists in the Ministry of Justice accepted to be involved in the research project and to take part in the training, non-human actors are involved in the network
Mobilisation	Fourth moment of translation: it is achieved when the actors are successfully enrolled and represent actors' interests (Callon, 1986a).	All the linguists of the Ministry of Justice accepted to be involved in the mentoring to start changing workflow of translation projects
Inscription	Creation of technical objects which ensure an actor's interests are protected, e.g. a particular piece of software or regulations to meet organisational objectives (Latour, 1992).	Adoption of a new translation workflow, creation of TMs and TBs, creation of a common repository to share and collect linguistic data to train NMT
Irreversibility	The point to which it is impossible to return to a point where alternative opportunities may exist (Walsham and Sahay, 1999).	Translation technologies are fully integrated in the translation process and there is no advantage in stopping using them

Immutable mobile	Strong properties within a network which establishes it irreversibility, e.g. software standards (Walsham, 1997).	The roles of actors are stabilised and share the same interest in a convergent network (Callon, 1990) creation of a subnetwork
Speaker/delegate/ representative	An actor that speaks on behalf of (or stands in for) other actors (Callon, 1986).	Linguists, researcher, IT personnel, head of office
Betrayal	A situation where actors do not abide by the agreements (translations[ANT]) arising from the enrolment of their representatives (Callon, 1986a).	- Translation technologies are not able to manage file format as expected - Some PCs are too old to support the tools - No OCR[3] tool is acquired to solve file format issue (Section 5.2) - No pseudonymization tool is acquired

Table 3.1 ANT terms and descriptions (adapted from Carroll et al. 2012) operationalised in the present study

"ANT suggests that 'reality' is dependent, contextual, and emergent and refutes the notion that there may be a 'fixed point' of analysis" (Carroll, 2014, p. 124). The different levels of granularity offered by ANT were useful in studying each phase of the implementation of translation technologies within the Ministry of Justice. This included the formation and alignment of networks to pursue the interests of specific actors, as well as the factors that influenced perception. caused satisfaction or frustration, induced motivation or reluctance in the participants through the different steps that led to the implementation of a new working environment incorporating various translation technologies (i.e. TMs, TBs, NMT) customised with their linguistic data.

3.4 Satisfaction and motivation as a multi-dimensional factor in an institutional context

As demonstrated in the literature review (Chapter 2), the accelerated development and dissemination of translation technologies are exerting a considerable influence on the work conditions and job profile of translation professionals. In particular, the emerging relationship between human and machine, which is the focus of some TS research, sometimes is described to be more conflictual than satisfactory (Cadwell et al., 2017; Läubli and Orrego, 2017; Vieira, 2018; do Carmo, 2020; Ragni and Vieira, 2021). This is one of the reasons why the present research also considers the impact of training, mentoring and subsequent optimisation of translation technology use with a translator-centred approach on the satisfaction, motivation and attitude of linguists.

The involvement of translators from the Ministry of Justice as key promoters of this change created optimal conditions for conducting research on the impact of motivation as a crucial factor to be investigated. In order to achieve this objective, the training phase and subsequent mentoring phase were of crucial importance in providing the participants with the necessary skills and familiarising them with the appropriate tools, thus enabling them to engage effectively with all organisational aspects of the introduction of translation technologies. It is also important to note that NMT is regarded as a tool that can be integrated with other tools to enhance the efficiency of translators' work (according to the augmented translation approach first introduced by Lommel in 2017), and that their experience and linguistic skills should guide the creation of a new workflow customized

[3] Optical Character Recognition (OCR).

according to their specific needs. The research design and all the training activities are planned in such a way that translators are able to exercise their agency and decide which tools and procedures are better suited to each type of document. In this context, agency (Section 3.2) was conceptualised as a phenomenon emerging from the dynamic interactions between human (translators) and non-human (translation technologies) actors within the network of the Ministry of Justice workplace, as postulated by Abdallah (2011).

Furthermore, satisfaction was found to be associated with a number of sociological and ergonomic factors, including personal relationships, job security, autonomy, organisational processes, technologies, and tools required to perform the job. In addition, it was identified as a crucial factor that could influence motivation to accept new challenges, which was identified as a key element in this study. It is widely acknowledged that linguistic specialisation is a prerequisite for authorising the use of PE in high-risk environments, such as the Ministry of Justice. The "bad reputation" that precedes NMT (Sepesy Maučec and Donaj, 2020, p. 1) could have a negative impact on the attitude of professional translators towards such technology, mainly because it was presented as a means to reduce translation rates and replace translators (Läubli and Orrego, 2017; Sakamoto, 2019; Vieira, 2020). It is therefore pertinent to include training in the utilisation of translation technologies as a core component of this study, as it is vital to equip participants with the requisite skills to optimise the potential of TMs, TBs and PE. Furthermore, it is crucial to ascertain whether familiarity with translation technologies and PE might influence their attitude towards translation tools and NMT.

3.4.1 Rodríguez-Castro's translator satisfaction model

In light of the multidimensional approach adopted in this workplace research, the construct proposed by Rodríguez-Castro (2015) for her investigation into job satisfaction and motivation appeared to be the most suitable: "a model of translator satisfaction for the industry […] (that) can be used: (1) to identify opportunities to enhance satisfaction and motivation, (2) to improve human resources and management policies for building long-term relationships, mentoring systems, training approaches and labor force retention practices" (ibid, p. 32).

Rodríguez-Castro noted that translators' job satisfaction or dissatisfaction can be caused by: external or extrinsic conditions stemming from the work environment; and internal or intrinsic conditions related to translators' perceptions, attitudes, values and personal characteristics. The researcher focuses on three main parts (or facets) that interact and influence satisfaction: elements that affect individual satisfaction (i.e., values, attitudes and behaviour, self-efficacy, professional skills); contextual aspects of work environment that influence team satisfaction and organisational elements that impact motivation and satisfaction at work; and professional aspects that determine job satisfaction (i.e., professional status, professional commitment and professional involvement). Motivation is the other essential element considered in the creation of the model, the intrinsic pleasure derived from performing a task in work activities, and is analysed according to Locke's

definition, the "internal factors that impel action and external factors that can act as inducements to action" (Locke, 2004, p. 388). In addition, she reported on a theory proposed by Bardi and Schwartz (2003) that group norms of behaviour have a strong impact on each member of the group and, as a result, even if personal values motivate individual behaviour, "the relationship between values and behaviour is partly obscured by norms" (ibid., p. 1217). Regarding attitudes, the researcher highlighted how they reflect a response to specific situations or actions, and "satisfaction itself can be seen as a general attitude toward work or work situations that has the cognitive, affective and conative elements" (Rodríguez-Castro, 2015, p. 40).

3.4.2 The impact of professional training on job satisfaction and motivation

This workplace research in a ministerial environment represents the opportunity to fill a research gap identified by Rodríguez-Castro in her doctoral thesis (2015, p. 76). In fact, in her detailed analysis of studies and theories related to job satisfaction and motivation, she noted that organisational culture has a great impact on employees' performance and organisation commitment (Hartnell et al., 2011), enhancing job satisfaction. Flexibility over stability and control (ibid.) are also preferential aspects, and the Ministry of Justice presents all these characteristics. According to the literature review performed by Rodríguez-Castro, these factors were not properly analysed in the language industry. The researcher also highlights that there is a strong correlation between professional involvement and professional satisfaction, because the acquisition of knowledge and skills of professionally involved employees has a positive impact over professional and personal growth (Mortensen and Fullmer, 2002): satisfied employees "seek higher skill development, more stimulating jobs, and larger workloads, and desire more job responsibility and involvement" (ibid., p. 1452).

An additional important element of this research included by Rodríguez-Castro in the basic principles to create her instrument is the analysis of the impact of life-long learning, professional training and coaching over job satisfaction and motivation. Studies from various industries (Mattox II et al., 2005; Pritchard, 2007; Strong, 2009) demonstrate how training and coaching are elements that represent the basis of retention policies and can positively influence workers' performance. The rules of the Italian public administration (Decree-Law No. 80/2021) also provide for regular training courses to ensure the professional updating of employees at all levels of employment.

Rodríguez-Castro's construct focused on the implementation of the intrinsic and extrinsic aspects of motivation in order to investigate whether job enrichment and professional growth (individual intrinsic aspects) could be a source of motivation, given the working conditions of translators in a globalised era made up of complex working conditions and relationships. However, she adapted Herzberg's theory to modern translation industry in order to create an instrument that is suitable for the complexity of a workplace that is part of industrialized language services. She also considered the "clan cultures" (Hartnell et al., 2011) according to which the sense of belonging to an organisation could be source of satisfaction.

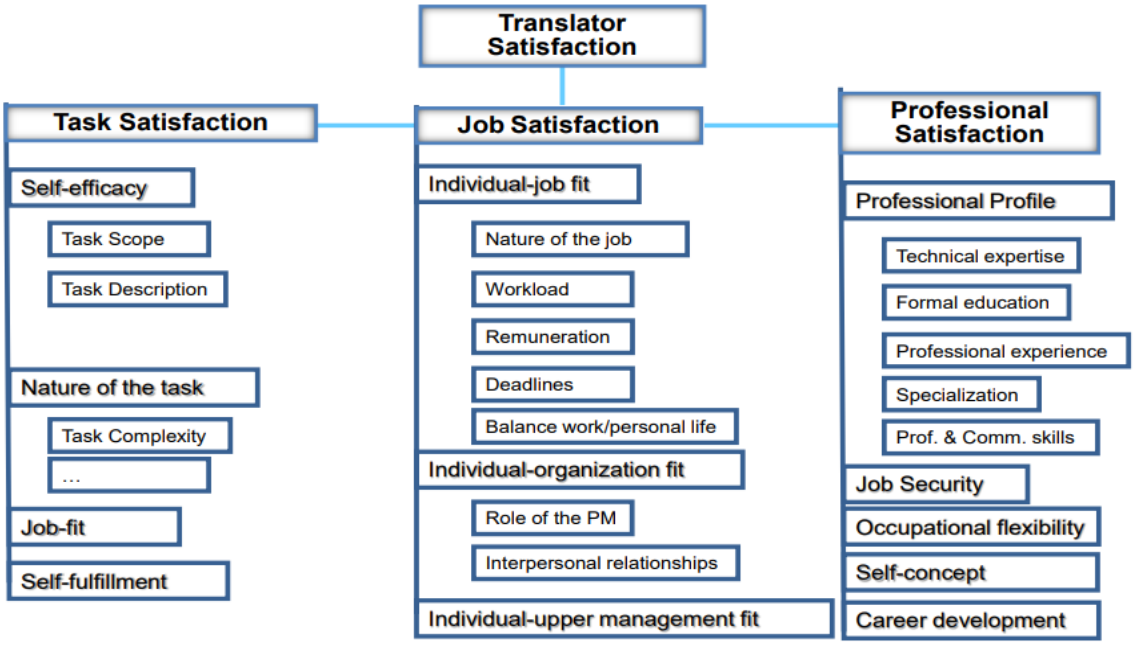


Figure 3.3 Rodríguez-Castro's three facets of satisfaction (2015, p. 98)

Adapting Rodríguez-Castro's multifaceted approach to the work environment and the participants of the Ministry of Justice (as described in Sections 4.5 and 4.6), I defined three facets in my study related to the variable of satisfaction and the relative indicators to investigate them: individual satisfaction, work environment and professional aspects (Table 3.2).

Variable	Facet	Indicators
Satisfaction	individual satisfaction	nature of job
		Autonomy
		Agency
		professional skills
		interpersonal relationships (colleagues)
	work environment	Policies
		technical support
		organisational elements
		Workstation
		Communication
		interpersonal relationships (management)
	professional aspects	professional status
		professional commitment
		professional involvement
		professional growth

Table 3.2 Rodríguez-Castro's facets of satisfaction adapted to the present study

3.5 Herzberg's two-factor theory and motivation

This ability to look at satisfaction from different perspectives, taking into account all the different elements that affect a translator embedded in an organisation (or, in our case, in a ministry), evaluating both the individual and the relational aspects, makes Rodríguez-Castro's construct particularly suitable for the present workplace research. Furthermore, one of the most interesting elements of this construct is that it is based on Herzberg's (1959) two-factor theory, which was

developed in the fields of human resource management, organisational theory, and behavioural science, and it is therefore particularly suited to the context of this workplace research. According to Herzberg, the sources of satisfaction and dissatisfaction have different origins: job content factors represent the "motivators"; job context factors represent the "dissatisfiers" (on the concept of "hygiene factors", see section 2.3). In Herzberg's model (Table 3.3), factors such as the achievement of goals, recognition of work done, opportunities for professional development and the nature of the tasks performed in everyday work are motivators. On the other hand, external factors such as working conditions, job status, relationships with colleagues, pay or company policy (e.g., the opportunity to be involved in decision-making or to express an opinion) are sources of job dissatisfaction.

Hygiene Factors (extrinsic characteristics)	**Motivating Factors** (intrinsic characteristics)
(factors associated with **dissatisfaction**)	(factors associated with **satisfaction**)
Salary and Benefits Interpersonal relations with superiors Interpersonal relations with coworkers Technical aspects of supervision Status Company policy Working conditions	Recognition for achievement Advancement Work itself Job challenge Responsibility Career opportunities

Table 3.3 Herzberg's Two-factor Theory (source: Herzberg, 1959, p. 81)

This approach seemed the most appropriate to investigate the first RQ about the impact of a new workflow based on translation technologies on translators' job satisfaction and motivation in the Ministry of Justice. In fact, the above table could be adapted to the objectives of the present research in order to evaluate the impact of additional intrinsic factors such as customised training, participatory/bottom-up approach, valorisation of individual professional skills and interpersonal relationship on the acquisition and implementation of new skills to promote satisfaction and motivation to introduce changes in the working environment.

On the other hand, in the hierarchical and highly structured ministerial environment, where professional roles have a strong impact on human relations and the ability to exert one's agency, elements such as achieving a common goal, problem solving, professional growth and improving working conditions are even more important to consolidate existing interpersonal relationships or to establish new ones, where translation technologies could become a motivator or a source of dissatisfaction. In fact, Herzberg's theory states that the sources of job satisfaction are different from the causes of dissatisfaction, and they do not exclude each other. Under certain conditions, hygiene factors can be the source of job satisfaction, and motivators can be the source of dissatisfaction. The absence of motivators does not necessarily lead to dissatisfaction but can reduce or limit the level of satisfaction that could be achieved by employees. Herzberg states that the content of tasks

performed in the workplace represents motivators that trigger a psychological, cognitive, and professional growth in the person (1966, p. 81), but on the other hand problems associated with the hygiene factors (i.e., working conditions, administrative policies, salary etc.) need to be solved to create the conditions for other motivators to impact positively on job satisfaction.

Another element that makes Herzberg's approach particularly suitable for understanding organisational behaviour within the Ministry of Justice and how it influences linguists' satisfaction and motivation is the relevance of the intrinsic aspects of the job, as well as the nature of the tasks performed, in determining variation in levels of job satisfaction. According to Herzberg's approach, the principle is that motivation should come from internal sources, i.e. the job itself, through challenging tasks or career development, from which the person's self-actualisation derives. External sources, such as rewards or punishments, can only cause temporary changes, not motivation (Herzberg, 1959). Therefore, given that the Ministry's experienced translators might already be satisfied with their jobs, it was the ideal situation to verify whether the participatory/bottom-up approach adopted in this research could be an opportunity to exercise agency and promote changes in their working environment through the introduction of translation technology, with a positive impact on their motivation and job satisfaction. "Rather than rationalising work to increase efficiency, the theory suggests that work should be enriched to bring about effective use of personnel" (Herzberg, 1968, p. 59).

Adapting Herzberg's theory to the context of the present research, I identified two main factors and indicators that could represent motivating and demotivating factors for the participants (Table 3.4):

Variable	Factor	Indicators
Motivation	intrinsic characteristics (motivating factors)	recognition for achievement
		customized training opportunity
		work itself
		job challenge
		Commitment
		Responsibility
		career opportunities
		participatory approach (promoting change)
		valorisation of individual professional skills
	extrinsic factors (demotivating factors)	salary and benefits
		interpersonal relations with management
		interpersonal relations with colleagues
		technological aspects of work
		Status
		ministry policy
		working conditions
		support from management

Table 3.4 Herzberg's Two-factor Theory adapted to the present study

3.6 Technology perception and institutional environment

The research conducted thus far (Beikian et al., 2019; Mohammed et al., 2020; Gough, 2021) demonstrates that the attitude of translators towards technology is an element to be considered in addition to the efficiency of the technology itself when analysing results such as productivity, quality, and cognitive effort related to the use of translation technologies in the workplace. During the 1990s, at the outset of TMs and MT systems, Lange and Bennett (2000) were among the first researchers to conclude in their study that translators' attitudes towards technology could have a positive or negative impact on their performance.

Dam and Zethsen (2016) in their study demonstrated that perceptions of the usefulness and threat of technology could differ depending on employment type. Specifically, public servants on permanent contracts seemed to feel less threatened by translation technologies, but this did not mean that all public servants were positively disposed for a variety of reasons. In the same study, Dam and Zethsen posit that the feeling of powerlessness and invisibility, as described by Abdallah (2010) in her interviews with Finnish translators, may also contribute to translators' job satisfaction. This suggests the potential value of a bottom-up approach, whereby the linguistic authority of the participants in the present study is accorded greater importance. Despite the awareness of the significance of their work, translators tend to perceive the translation task as an activity that is often eclipsed by two other pursuits: the creation of the product (which could be software, a website, a smartphone, or, as in the case of the Ministry of Justice, a judgement or a legal opinion) and the release of the product to the market (or publication). As also reported by Sela-Sheffy and Shlesinger (2008) in their large-scale study of Israeli translators, the prevailing sentiment among professional translators is one of powerlessness and invisibility, despite their awareness of the significance of their work. This incongruity between the recognition of an elevated degree of professionalism required by the role of legal translators and their lack of recognition by their superiors represents a key area of interest within the present study, as it may potentially contribute to feelings of demotivation or dissatisfaction.

An additional perspective on the influence of perception on technology adoption is presented by Cadwell et al. (2016) in their study on translators' perceptions of MT and PE at the DGT. The findings indicated that translators who perceived the MT output as of good quality were motivated to utilise it for increased productivity, to find inspiration during the translation process, to gain an understanding of the text to be translated or to translate documents that were particularly suited to MT. Conversely, translators who had a negative perception of MT output quality or had a negative attitude to PE did not utilise it because they did not find it useful for the type of text they were translating or because they believed it could introduce errors. Furthermore, they expressed apprehension about technology, citing concerns about its uncontrollable nature, the potential to be replaced by MT, and the perceived greater effort required to correct MT errors compared to traditional translations. They also

demonstrated a lack of trust in MT and perceived that their linguistic abilities and creativity were hindered by its use.

In their study, Lee and See (2004) defined trust as "the attitude that an agent will help achieve an individual's goals in a situation characterised by uncertainty and vulnerability" (ibid., p. 51). The researchers found that attitudes are shaped by beliefs and perceptions, which in turn influence particular intentions and, subsequently, the actions that result from them. Many studies (Gough, 2011; Alotaibi, 2014; Mahfouz, 2018) have examined translators' attitudes toward CAT tools, primarily in the academic context of university students. Gough's (2011) study specifically focused on the examination of awareness, perception, usage and participation with respect to novel tools and processes. The study concluded that translators' awareness and utilisation of tools depend on their attitude towards new technologies, while formal education and training do not influence the use of CAT tools. While I concur with Gough's assertion that attitude plays a significant role in translators' awareness and utilisation of technology, I am not in agreement with the proposition that training is of no consequence.

The present study aims to verify whether the impact of attitude on the reasons for the adoption or non-adoption of technology in the context of the Ministry of Justice confirms the above mentioned results or provides some new perspectives, possibly due to the participatory approach proposed in the present study. Rossi and Chevrot's survey (Section 2.6) is based on the TAMs developed to predict individual adoption and use of new IT (Venkatesh and Bala, 2008). TAMs aim to help managers foster technological innovation in the workplace, focusing more on the technology than on human factors. Rossi and Chevrot's integrated the principles on which TAM was based with "the parsimonious addition of factors in the model (namely "fear of MT" and "perceived impact of MT")" (Rossi and Chevrot, 2019, p. 183). As specified by the researchers, "fear of MT" refers to the "degree of security that translators felt in relation to MT" (ibid., p. 200), an element to evaluate if MT represents a support or a threat (see Section 2.6). One limitation of TAMs is their failure to consider the social dimensions of an environment, such as organisational aspects, human relationships, and working dynamics, which are typical of places like the DGT or the Ministry of Justice. As Kenny (2017) and Olohan (2017) have pointed out, technology is not neutral, and the successful implementation of new technologies is heavily influenced by the context in which they are deployed. In addition, the researchers sought to assess the following predictors: "experience, perceived usefulness and perceived ease of use, fear (rated on a scale of security) and perceived impact of MT" (Rossi and Chevrot, 2019, p. 188). Regarding the evaluation of translation technologies, in the present study I also considered the principles from the Artificial Intelligence Anxiety (AIA) scale developed by Wang and Wang (2019) "to predict behaviour, measuring self-perceived fear and unease about AI technologies/products" considering that "effects of anxiety may be either facilitating or debilitating. Facilitating anxiety enhances performance, whereas debilitating anxiety inhibits performance" (ibid., p. 4).

In order to address the second RQ at the heart of this study, I have adapted the principles set out by Rossi and Chevrot (2019) to assess attitude towards technological innovation in the institutional environment. In particular, I have focused on two key concepts: the fear of MT and the perceived impact of MT. Three factors were identified as potentially influencing participants' attitude towards translation technologies: translation technology fear, the perceived impact of translation technologies and the social dimensions of translation technologies. Some indicators were defined for each factor (Table 3.5).

Variable	Factors	Indicators
Attitude	translation technologies fear	anxiety for technology failure
		risks associated with the use of technology
		Misconceptions
		Uneasiness
	perceived impact of translation technologies	support or threat
		changes in working habits
		technological issues
		user experience
	social dimension of translation technologies	organisational aspects
		human relationships
		working dynamics

Table 3.5 Indicators of attitude adapted for the present study

3.7 Concluding remarks

This chapter begins by outlining the multifaceted nature of translators' job satisfaction and the potential advantages offered by workplace research for investigating job satisfaction, motivation and attitude in relation to the adoption of translation technologies from a multidimensional perspective, considering the personal, technical, and social factors. The significance of translators' agency and autonomy are also highlighted as core elements of the research.

A section is dedicated to the analysis of other workplace research performed in institutional environments that focus on the relationship between humans and machines. This research employs ANT as a theoretical construct that was adapted to the context ot the Ministry of Justice.

The remainder of the chapter presents the key theories and constructs that were adapted to this study in order to gain a multidimensional perspective of the variables under investigation. The following approaches were considered: ANT, Rodríguez-Castro's construct, Herzberg's two-factor theory and TAMs, as adapted by Rossi and Chevrot.

The present research is conducted within the aforementioned framework and aims to investigate the job satisfaction, motivation, and attitude towards technology of translators, encompassing both the individual and social spheres, the participants' autonomy, the ministerial processes, as well as the tools utilized to perform the job.

Chapter 4 MMR and the multiphase approach

4 Introduction

This chapter will be divided in two parts. The first part presents the MMR design combined with ANT and the three-phase convergent parallel mixed methods design, as well as the principal aspects of longitudinal research. This design involves collecting quantitative and qualitative data in parallel, giving them the same weight, and merging them during interpretation. The chapter then goes on with the second part describing the research setting and the participants, as well as the data collection procedures, the methods used to analyse data and the description of the double meaning of "bottom-up" approach in the present research (a model to introduce translation technologies in an organisation and a method of qualitative data coding). The ways to address ethical concerns are also included. The chapter ends with some concluding remarks.

4.1 Why mixed methods design

The MMR methodology was deemed to be the most appropriate for this kind of research because it integrates various methods to address the research questions using the most accurate and flexible approach (Bryman, 2012; Creswell, 2015; Creswell and Plano Clark, 2011) for the present workplace research. According to Creswell and Plano Clark (2011), this methodology involves the collection, analysis, interpretation, and reporting of qualitative and quantitative data guided by the paradigm of pragmatism, the philosophy that is most relevant to convergent design. The initial step in conducting a comprehensive evaluation of the potential benefits and drawbacks was to identify the research worldview, taking into account the specific characteristics of the present study and the research objectives.

4.1.2 Why not other approaches

During the preliminary investigations conducted to ascertain the most suitable methodological approaches for the present study, the concept of Participatory Action Research (PAR) was given due consideration. This approach is oriented towards problem resolution rather than the contribution of theoretical knowledge, with the objective being the generation of actionable input. PAR studies offer a high degree of flexibility; however, they exhibit limited generalisability and considerable difficulty in terms of replication. PAR is most frequently employed to enhance working environments and practices in the healthcare sector (Lingard et al., 2008; Whitehead et al., 2003) and is well-suited to the participatory approach, the change in workflow introduced by translation technologies and the involvement of the researcher in the study. However, this approach was quickly rejected on the grounds that it was excessively problem-based and solution-oriented, with the risk that the professional aspects would take precedence over the academic perspective of contributing to theoretical knowledge.

Among the other potential theoretical frameworks focusing on the importance of translators' situatedness and interaction with their environment to explain translation as a process that could be

used for the present study, I explored the potential of situated cognition. "This experiential concept of knowledge has its theoretical and epistemological origins in the approaches of constructivism and is empirically grounded in the findings of modern-day neuroscience and cognitive science" (Risku, 2017, p. 292). Risku argues that knowledge is dynamic as it is connected to reality (Clark, 1997; Montebelli et al., 2008). Furthermore, it is "situated" as it is "in part a product of the activity, context, and culture in which it is developed and used" (Brown et al., 1989, p. 32). Therefore, this theoretical approach suggests that it is important to investigate participants and their activities within their social and environmental context. This new perspective had a significant impact on the methodological approach, particularly in workplace studies, and provided new insights into the role of the researcher. Despite the present research not adopting the situated cognition approach, it draws on numerous principles related to workplace research methods and ethnography. Nevertheless, the focus remains on the impact of social and environmental factors on translators' behaviour and choices, as opposed to delving further into the cognitive perspective. In the field of TS, situated cognition has been employed to investigate how various contexts influence translators' decisions while translating. These contexts include the physical environment where a translator works, the cultural norms and expectations of the language community they belong to, and the technological tools at their disposal. The present research draws inspiration from the aforementioned principles with the objective of comprehending the role that context plays in shaping translation processes and informing decisions regarding translation technologies. However, as Risku (2017) noted, a situated cognition perspective aims to investigate not only the translation process, but also the quality of the translation and in the present study, translation quality was only a marginal element. Furthermore, the active engagement of researchers, while essential for gaining deeper insights, also carries the potential for pitfalls: their presence and questions may shape the interaction between participants and their environment, and their own biases and assumptions could influence the research outcomes. Christensen (2011) also identifies situated cognition as the most appropriate framework to investigate the interaction between translators and translation technologies; nevertheless, the decision was taken not to adopt this approach, primarily because it was designed to focus exclusively on specific, more 'intimate' aspects of translator-machine interaction. Furthermore, the risks associated with the personal involvement required of the researcher, in conjunction with the complexity of the workplace research that I had to conduct alone, served as disincentives for the utilisation of the situated cognition framework.

4.2 Research worldview

In the present study, it was necessary to find a compromise between the methodology and the theoretical framework adopted, in order to allow the necessary flexibility for workplace research.

4.2.1 MMR and pragmatism

Pragmatism represents a suitable paradigm for this workplace research as it provides the opportunity to gain a comprehensive perspective of the different interrelated phenomena that contribute to

providing an answer to the two RQs. Each phenomenon may be investigated using both a qualitative and quantitative tool, and each different point of view resulting from these independent investigations contributes to the creation of a complete overview of the elements under investigation. The subjective view, for example, helps to identify factors that affect motivation of participants, and the objective view helps to examine the impact of attitude towards translation technologies over these factors. Furthermore, the combination of inductive and deductive reasoning represents the basis to try and solve divergence that may arise from the MMR approach through abduction, “the moment of creative inspiration during which the researcher conceives of a hypothetical explanation for some empirical fact” (Miller and Brewer, 2003, p. 2).

Dewey (1929) states that the philosophy of pragmatism is associated with a pluralistic ontological position (due to multiplicity and complexity of reality) and an epistemological stance assuming that ‘interactions’ or ‘transactions’ with the environment are needed to build knowledge. The advantage of this paradigm for the proposed workplace research is that it “is pluralistic and oriented towards ‘what works’ and practice” (Creswell & Plano Clark, 2011, p. 41). However, in contrast to Cresswell and Plano Clark's statement, the present research still acknowledges the researcher's influence, which is a valid aspect of post-positivism.

Furthermore, considering the role of the researcher as a facilitator of change in the present study, it is interesting to note that Morgan (2014) focuses on the emphasis that pragmatism poses on action promoting the action-oriented approach instead of the traditional philosophical research paradigm (i.e. ontology, epistemology, theoretical perspective, methodology and methods), because the meaning of an experience is caught with action, and this leads to the need to integrate quantitative and qualitative data. “Pragmatists promote the notion of action determining thinking in research. Researchers operating from a pragmatist philosophy will frequently incorporate action and reflection into their exploration of a construct” (Flynn, 2022, p. 435).

The great advantage of using MMR with a convergent design for the present workplace research is the opportunity to integrate the inductive, subjective and contextual elements of qualitative research with the deductive, objective and generalizing elements of quantitative research (Morgan, 2007). Notwithstanding the particular characteristics of each workplace setting, which exert a significant influence on the transferability of the study, the fundamental principles and methodologies employed in the present research can serve as a foundational point of departure, adaptable to the distinct requirements of the environment under investigation. One of the most challenging aspects of designing the research plan for this study was to identify an approach that would enable me to focus on specific aspects of the data while still maintaining a comprehensive overview. This would allow me to gain a nuanced understanding of the entire phenomenon while also delving into the details that might otherwise remain obscured. In situ observation and interviews are two of the most common methods used in qualitative research, whereas surveys and questionnaires are the typical

instruments used in quantitative approaches to collect data. Qualitative analysis “is a holistic method that is subjective in nature and is somewhat dependent on participant openness and collaboration […] data collection and analysis processes are designed to be in-depth […]; encompass multiple data collection points” (Flynn, 2021, p. 492). On the other hand, a quantitative inquiry brings breadth to the research because it is based on a scientific method that “use(s) deductive reasoning to form a hypothesis, collect(ing) numerical data” (Flynn, 2021, p. 493) and then exploits statistical analysis of these data to try and answer research questions and confirm hypothesis. I am inclined to concur with the position advanced by Felizer, who posited that “pragmatism brushes aside the quantitative/qualitative divide and ends the paradigm war by suggesting that the most important question is whether the research has helped to find out what the researcher wants to know” (Feilzer, 2010, p.14).

4.2.2 ANT and interpretivism

The present study is also informed by the principles of ANT, and as noted by Cresswell (2010), ANT is the right approach to consider technology not as an external force that affects people, but as an element that stems from social interests, such as economic or professional interests, with the potential to influence social relations. It is important to consider that MMR is usually associated with pragmatism, as reported above, while ANT is associated with interpretivism (Section 3.3).

Interpretivism is based on the premise that reality is not an objective entity, but is subjective, varied and shaped by social constructs. In essence, it suggests that understanding reality requires acknowledging the experiences of individuals within it, which may vary significantly due to historical or social influences. Interpretive methodologies prioritise inquiry and observation in order to reveal a nuanced understanding of the subject under study. These methods are closely linked to qualitative data collection techniques and emphasise the importance of exploring the depth and richness of human experience. Weber (1968) laid the groundwork for interpretivism by emphasizing the importance of understanding social phenomena from the perspective of the actors involved. He highlighted the role of subjective interpretation in social action, arguing that individuals' beliefs and values shape their behaviours.

From an epistemological and ontological perspective, ANT states that the world is made up of networks (Law, 1992), which can include people, ideas, concepts, and objects, all of which are seen as actors exercising their own agency in the network. ANT is a theoretical and methodological approach to social theory that is compatible with the constructivist ontological paradigm and the interpretivist epistemological stance that could also be adopted in this research project. According to the constructivist philosophy and interpretive methodology, a researcher should have an insider's perspective to gain a deeper understanding of a social setting or activity, analysing the human behaviours and experiences that make up constantly changing, subjective realities (James and Busher, 2009; Matthews and Ross, 2010). As a result, only the different perspectives of social actors

participating in the social world under study can be used by the researcher to study the phenomenon of interest (Kelly et al., 2018). In addition, the qualitative methodology is generally used in an interpretivist approach (Saldaña and O'Brien, 2014), which is associated with inductive and deductive reasoning by the researcher.

4.2.3 Combining pragmatism and interpretivism

This study attempts to combine the epistemological stances of pragmatism (relevant to MMR) and interpretivism (relevant to ANT) in order to find the appropriate way to discuss the different dimensions of the present workplace research: technological and sociological aspects (empirical focus on actions in pragmatism, and on socially constructed cognition in interpretivism), subjective and objective approaches to data analysis, and the role of the researcher (engaged in change for pragmatism, and engaged in understanding for interpretivism).

In a paper on interpretivism and pragmatism in qualitative information-systems research, Goldkuhl (2012) states that explaining and understanding are forms of knowledge pursued by pragmatism, but understanding is also a “key form of interpretivism” (ibid., p. 8), and according to this assumption, it seems that it could be possible to combine interpretivism and pragmatism in a research project. Goldkuhl (ibid., p. 11) states that both philosophies view social reality as a product of social interaction because there are “common ontological assumptions behind both pragmatism and interpretivism. These can be summarised as: Meaningful action based in evolutionary social interaction”.

Pragmatism requires that the researcher participates in the action to generate knowledge through observation and analysis, and interpretivism requires the researcher to be involved in the process of gathering and interpreting data. Creswell (2003) and Patton (2002) advocate for a multi-philosophy approach because the combination of two or more philosophies allows the researcher to balance the strengths and weaknesses of the philosophies. This combination of approaches should facilitate the investigation of the dependent variables from a multidimensional perspective, with consideration of the independent variables (Section 3.1) pertaining to the work environment and my involvement as a trainer initially, mentor subsequently, and consultant towards the conclusion of the study.

4.3 MMR, convergent design, and multiphase approach

According to the RQs, the aim, and the participants of the research, the first element that should be considered when choosing a research design is the priority of the approaches, that is the relevance assigned to qualitative and quantitative data (Plano Clark and Ivankova, 2016). There are three priority options, depending on the decision to give more emphasis to quantitative data collection and analysis, to qualitative data collection and analysis or to give equal weight to both. The second element to be considered is the level of interaction between quantitative and qualitative data, that is to decide whether they “are kept independent or interact with each other” (Creswell and Plano Clark, 2011, p. 64). Quantitative and qualitative data sets can be mixed at four possible stages of the

research process: design level; data collection; data analysis; and data interpretation. Considering the longitudinal, multi-phase nature of the present study, it would be advantageous to maintain the data sets as independent entities and integrate them only after the conclusion of the data analysis, at the final stage. This approach would facilitate the collection of data from different sources and allow for the acquisition of diverse yet complementary data on the same element under investigation, which could then be combined prior to the interpretation of findings. An additional rationale for adopting this approach is that, having worked with two distinct groups in two different locations, with the training of one group commencing three months after that of the other (Figure 4.4), an exploratory data analysis was conducted to enhance the training and address some technical issues in the latter group. However, it was of the utmost importance to ensure that the findings from the initial cohort did not unduly influence the approach taken with the second group. Notwithstanding the assertion of Creswell and Plano Clark (2018) that the sample size is a minor issue in a mixed method approach, which can be addressed through the implementation of various strategies, the total number of participants was inadequate to permit the consideration of the two groups as representing two distinct realities. Moreover, an investigation of the social perspective of both groups as a whole was an essential component of the study.

In the present research the three-phase approach was also essential to monitor the evolution of the dependent and independent variables (Section 3) under study in order to be able to make small adjustments to the processes or translation tools according to the changing needs of participants as they acquire new IT skills or the technological requirements of each phase of the project, supporting them in the creation of their own workflow. Consequently, there was the need to make small changes to the questions of the questionnaires or interviews. For example, due to internal changes in the management of the Ministry (Section 4.5), the training of the NMT engine was postponed by about three months, which affected all related activities and the planned data collection (Section 4.7).

The decision tree created by Creswell and Plano Clark (2011) related to the above-mentioned criteria for MMR design helped me define the best approach following three essential parameters: the "timing" (What will the timing of the quantitative and qualitative methods be?), the "weighting" (What will the weighting of the quantitative and qualitative methods be?) and the "mixing method" of data (How will the quantitative and qualitative methods be mixed?).

After balancing the pros and cons, pragmatism with the four key characteristics reported by Creswell (2008) (i.e. consequences of actions, problem-centred, pluralistic and practice-oriented) was identified as the theoretical assumption that would inform the workplace research presented in this study, combined with interpretivism as far as the ANT approach is concerned (mainly for the insider perspective and the social dimension of the research). Other elements that influenced the final choice were "(1) the level of interaction between the strands, (2) the relative priority of the strands, (3) the timing of the strands, and (4) the procedures for mixing the strands" (Creswell and Plano

Clark, 2018, p. 64), the number of participants, and the duration of the study. Consequently, the convergent parallel design mixed with the multiphase design appeared to be the most appropriate to answer the RQs investigated in this study. In the convergent parallel design of the present study, quantitative and qualitative data are collected concurrently during the same phase of the process, methods are equally prioritized, data are analysed independently using approaches specific for each kind of data (Wisdom and Creswell, 2013; Schoonenboom and Johnson, 2017; Creswell and Plano Clark, 2018) and results are mixed only at the overall interpretation step. This design is useful to corroborate, validate and triangulate data sets of both methods, in order to obtain a broader view of the issue investigated. At the point of interface, results can be merged with a direct comparison, searching for common concepts between quantitative and qualitative findings, transforming one type of result into the other kind of data (i.e. under the lens of thematic analysis, Section 4.10.1) and integrating the transformed dataset into the other one (Creswell & Plano Clark, 2018). In the last step, I can evaluate if the findings converge or diverge, combining the results to answer the research questions. Figure 4.1 represents the flowchart inspired by Creswell and Plano Clark (2018) related to the procedures of the convergent parallel design applied in the present research:

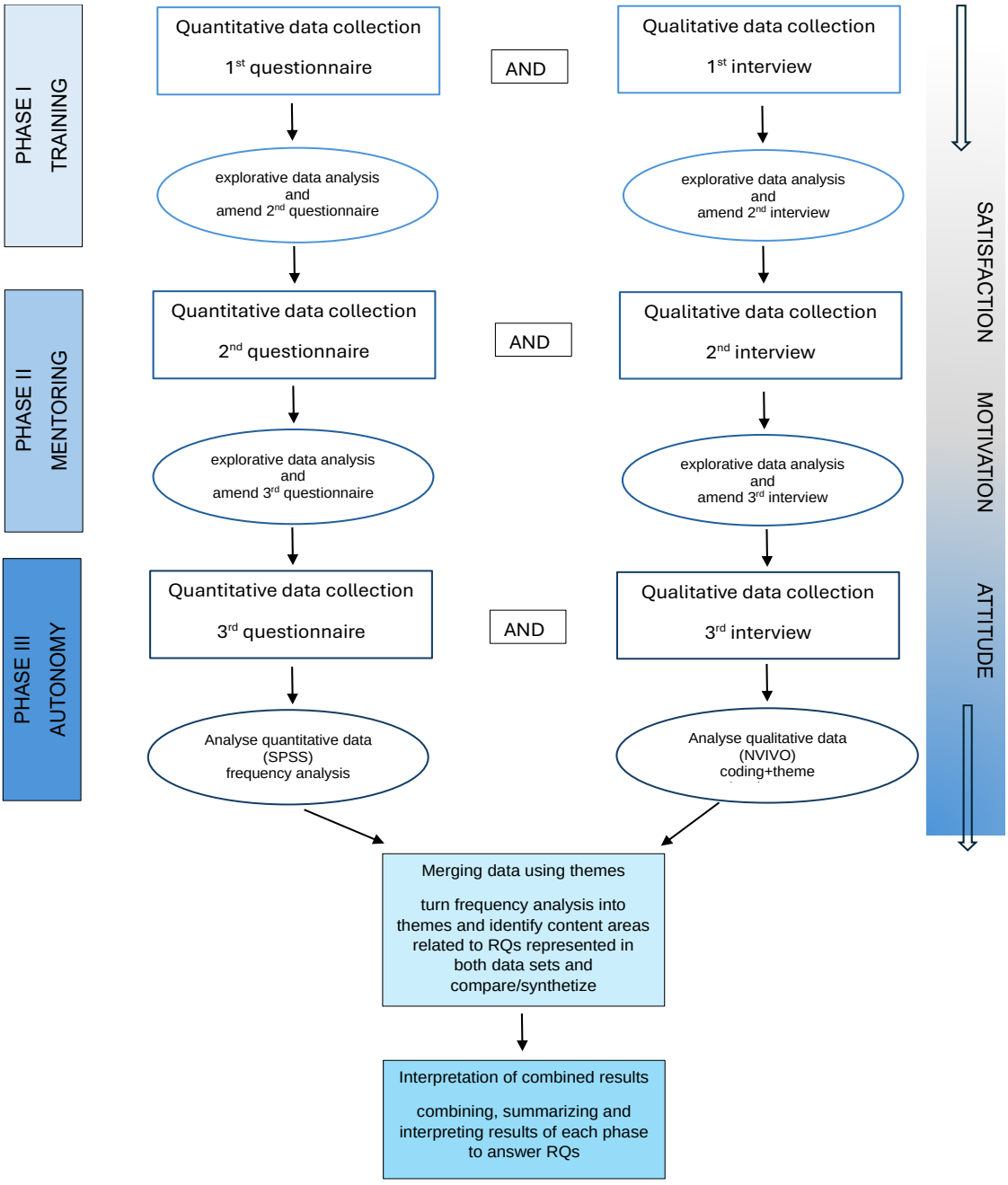


Figure 4.1 Flowchart of the basic procedures in implementing convergent parallel design in the present research

The flexibility offered by MMR, combined with the multiphase design, proved to be particularly appropriate not only for the nature of the research, but also for the other conditions under which the fieldwork had to be carried out: the need to work in two different locations with two groups of different sizes; the constraints imposed by the sensitivity of the documents and the IT technical/security requirements; and the need to integrate the research into the regular daily activities without interrupting them (Section 4.5).

The multiphase design is generally used to investigate an issue or a phenomenon through an iteration of quantitative and qualitative studies that are connected and sequentially arranged, and each phase exploits the elements and the findings acquired in the previous phase to make

adjustments or additions to the next phase with the aim of answering research questions. “The purpose of this design is to address a set of incremental research questions that all advance one programmatic research objective” (Creswell and Plano Clark, 2018, p. 100). In particular, this study attempts to gain an understanding of the multidimensional perspective of the dependent variables by examining the potential for a participatory approach to the introduction of translation technologies to facilitate a new relationship between the human and the machine, focusing on the human factor and optimising the balance between the two. The necessity to examine human and non-human actors as equals, considering not only the dynamics that could be favourable to the introduction of technologies in the workplace, but also the factors that could be source of disagreement or resistance to technological change, is the reason why, despite the fact that the SCOT approach was considered as an alternative to ANT for the purpose of the study, it was ultimately dismissed. SCOT's primary focus is on identifying the social groups that exert the greatest influence in shaping the design of a specific technology and determining the optimal implementation strategies. In contrast, ANT centres on the strategies employed by various actors in the design process, taking into account the perspectives of all involved actors, both human and non-human.

4.3.1 Advantages and challenges of MMR

An MMR design combines the strengths and compensates for the weaknesses of each method at the same time, producing the knowledge needed to inform theory and practice (Johnson and Onwuegbuzie, 2004). As evidenced by this research, interviews and field notes are essential to achieve depth and understand the working environment and context, training needs and professional particularities, since they allow researchers to catch the genuine opinions of participants. At the same time, questionnaires give breadth to the research to obtain more objective, generalizable, and quantifiable data. Moreover, this methodology provides the advantage of triangulating quantitative outcomes with qualitative results and vice versa. It represents an opportunity to achieve different divergent and complementary perspectives of the questions under investigation or grant credibility and stronger evidence for conclusions through the corroboration and combination of interrelated data and information collected from diverse sources (Carter et al., 2014). Furthermore, Maxwell (2016) highlights other important aspects of the MMR approach, in particular the solid foundation, methodological flexibility, and in-depth comprehension.

The results obtained with MMR can provide a holistic view of a phenomenon and, in case of contradictory findings, it is possible to investigate the limitations of the study or further explore correlations between its components (Venkatesh et al., 2013). One of the possible causes of divergence in data collected between two phases of research could be the use of anonymous questionnaires in a quantitative phase and non-anonymous interviews in a qualitative phase that could result in different responses, in particular when sensitive topics are under investigation. Although the mixed method design is useful to compensate for the small size of the group under study and to collect more data, it is essential to avoid that the ethnographic or professional data

collected with the questionnaire could be paired with the information collected with the interviews, thus compromising the anonymity of the participants (i.e., working languages or group of investigation could be easily associated with the profile of the linguists). For this reason, the questionnaires and interviews were collected separately, using different methods of anonymisation: in the questionnaire, the participants chose their alphanumeric codes (unknown to the researcher), which were used for all three questionnaires and were later replaced by a progressive alphanumeric code by the researcher for practical reasons; and in the interviews, the researcher anonymised the names of the participants interviewed by assigning an alphanumeric code to each of them.
Considering the theoretical framework of ANT, in the present study the collection of quantitative data was only used to understand the main characteristics of the working environment and conditions before the beginning of the practical intervention, and to capture some of the participants' points of view and perspectives during the whole development of research project, in order to have a picture that could represent elements of the evolution of the network and the relations between the actors, to be complemented with the internalised perspective represented by participants in the interviews. The questionnaires focused on the main elements to be studied, forming the core of the research, and their structure remained unchanged throughout the research (number of closed, Likert scales questions and number of open questions). The aim of the interviews was to gain a greater understanding of the aspects underlying the main themes and generate data about participants' interpretation rather than facts (Warren, 2001, p. 83), so that interviewees had the active role of "meaning makers" (Holstein and Gubrium, 1995, cited in Warren 2001, p.83). The assumption was that, given the anonymous form of the questionnaire compared to the personal exposure of the interview, the analysis of the quantitative data could have highlighted any contradictions or confirmed any ambiguous results in the qualitative data.

The use of MMR in this study presented some difficulties not only in research planning and the effort required to collect data as planned, but also in operationalising the research design. The difficulties in operationalising the research design arose from the need to: keep full control of the fieldwork for the whole duration of the field study with the possibility to make adjustments; identify indicators that could be valid for both quantitative and qualitative data; converge the results of data analysed using a quantitative approach with the results of data related to ANT theory analysed using a qualitative approach; and adopt a reliable and flexible method for both approaches. Thematic analysis (TA) was found to be the most flexible and reliable method under these conditions (Section 4.8.1).

Another challenging aspect of MMR was the adoption of a paradigm that could underpin not only the quantitative and qualitative approaches, but also the theoretical framework of ANT. The solution was the combination of two different worldviews: pragmatism and interpretivism (Section 4.2.3).

4.4 The longitudinal research approach in the present study

An additional relevant characteristic of the multiphase design of the present fieldwork research is the longitudinal approach, whereby the same variables (i.e. satisfaction, motivation and attitude) and the 22 participants were observed repeatedly over about 12 months. Given the small cohort of this study, longitudinal data was a means of ensuring dependability and also provided an opportunity to uncover significant factors that may serve as key indicators in explaining the changes experienced by participants over time. The longitudinal approach provided an opportunity to evaluate the impact of training and mentoring on participants' satisfaction and motivation in using translation tools, and to study the evolution of their attitudes towards technology as they acquired new skills and, consequently, greater awareness and autonomy. In considering the characteristics of the present research, I have identified the following criteria for defining this research project as longitudinal: Mari and Meglio (2013) that in the field of organisation study identify two key elements of longitudinal research: fieldwork and engagement with the research setting over an extended period of time; and White and Arzi (2005) that in their research on science education put forth the duration of the study and the nature of the measurements employed as the two criteria for characterizing longitudinal studies. In particular, White and Arzi posit that a longitudinal study must persist for a minimum of one year, and that identical measurements must be employed to ascertain whether a change has occurred. Another salient feature that distinguishes this study as a longitudinal one is its focus not only on "how people change" but also on "how people respond to change" (Corden and Millar 2007, p. 529). Moreover, a further characteristic of the present study, which is typical of longitudinal research, is the necessity for the researcher to be prepared to address changing circumstances, whether desired or unexpected. Although Saldaña (2003, 2016) primarily discusses qualitative longitudinal research, she presents seven guiding questions for analysing data on changes, which proved invaluable in planning this study:

1. What increases or emerges through time?
2. What is cumulative through time?
3. What kinds of surges, epiphanies, or turning points occur through time?
4. What decreases or ceases through time?
5. What remains constant or consistent through time?
6. What is idiosyncratic through time?
7. What is missing through time? (2003, p. 64)

Longitudinal studies are not a common feature of TS research. Those that do exist tend to focus on either translation competence or translation competence acquisition. They are generally process- or product-oriented, as evidenced by studies such as Kujamäki's (2019) or PhD theses (see, for example, Cheng, 2017; Kumpulainen, 2016; Quinci, 2015). Abdallah (2014a), Liu (2017) and Risku et al. (2019) employed a mixed-methods, longitudinal approach in their studies. This is due to the fact that in addition to the advantages mentioned above, such studies are often a) time-consuming,

b) require the development of tools suitable for comparative analysis, c) necessitate the control of independent variables, and are d) prone to "attrition" of participants (that is the loss of participants over time as for a variety of reasons, including death, refusal to participate in the study, and relocation outside the study area) (Göpferich, 2009).

The following two sections will present an overview of the research project's work environment and participants.

4.5 Introducing the Ministry of Justice

The Ministry of Justice is a department of the Italian government, and it is responsible for the organisation of the civil, criminal and juvenile justice administration, as well as the administration of magistrates and prisons. At the head of the Ministry is the Minister of Justice appointed by the President of the Republic on the proposal of the Head of Government. The Minister of Justice is the only one directly mentioned in the Constitution. The organisation is structured into direct cooperation offices (the Secretariat of the Minister, the Cabinet of the Minister, the Legislative Office, the Inspectorate General, the Office for the Coordination of International Activity, the Internal Audit Service, the Spokesperson of the Minister, and the Press and Information Office) that report directly to the Minister and four departments: Department for Justice Affairs (DAG) with three Directorates-General; Department of Judicial Organisation, Personnel and Services (DOG), with seven Directorates-General; Department for Juvenile and Community Justice (DGM), with four Directorates General; and Department of Penitentiary Administration (DAP), with three Directorates-General. A particular function is performed by the Directorate General Automated Information Systems (DGSIA), which is endowed with cross-cutting competencies. Each department is headed by a general manager, who is assisted by two deputies.

Figure 4.2 is extracted from the official website of the Ministry of Justice and represents the organisational structure of the Ministry in all its complexity. The internal organisational structure and bureaucracy typical of a ministry had a significant impact on the planning of the research design (Section 4.7). Any action to be taken or request to be made must be submitted to the appropriate office in accordance with a hierarchy of responsibilities that must be respected. This involves adhering to the procedures and timeframes set out by the relevant office. In this context, even if the participants were part of the Directorate-General for International Affairs and Judicial Cooperation, it was crucial to obtain the maximum cooperation and support from the offices and staff not directly involved in the translation process (highlighted in red in the following image, i.e. the IT Office, the Data Protection Officer, the Digital Innovation Office, the Financial Planning Office) in order to complete the work in the field.

The Ministry of Justice demonstrated its willingness to provide comprehensive assistance and resources, offering space for the training meetings, issuing me with a badge to facilitate free access to the offices during the mentoring phase, and allowing the linguists to exercise their autonomy in

determining their participation. In particular, the Head of Department who approved the project had a personal interest in the use of AI and had already conducted personal investigations on the subject. In addition, the Ministry of Justice had to consider how to accommodate the increase in projects and contacts with foreign countries. This resulted in an elevated demand for translations, which placed additional pressure on internal linguists and necessitated a greater reliance on external translation services. Given the absence of translation technology expertise within the Ministry, my research project provided an opportunity to test a potential solution that could be implemented with a relatively modest resource commitment.

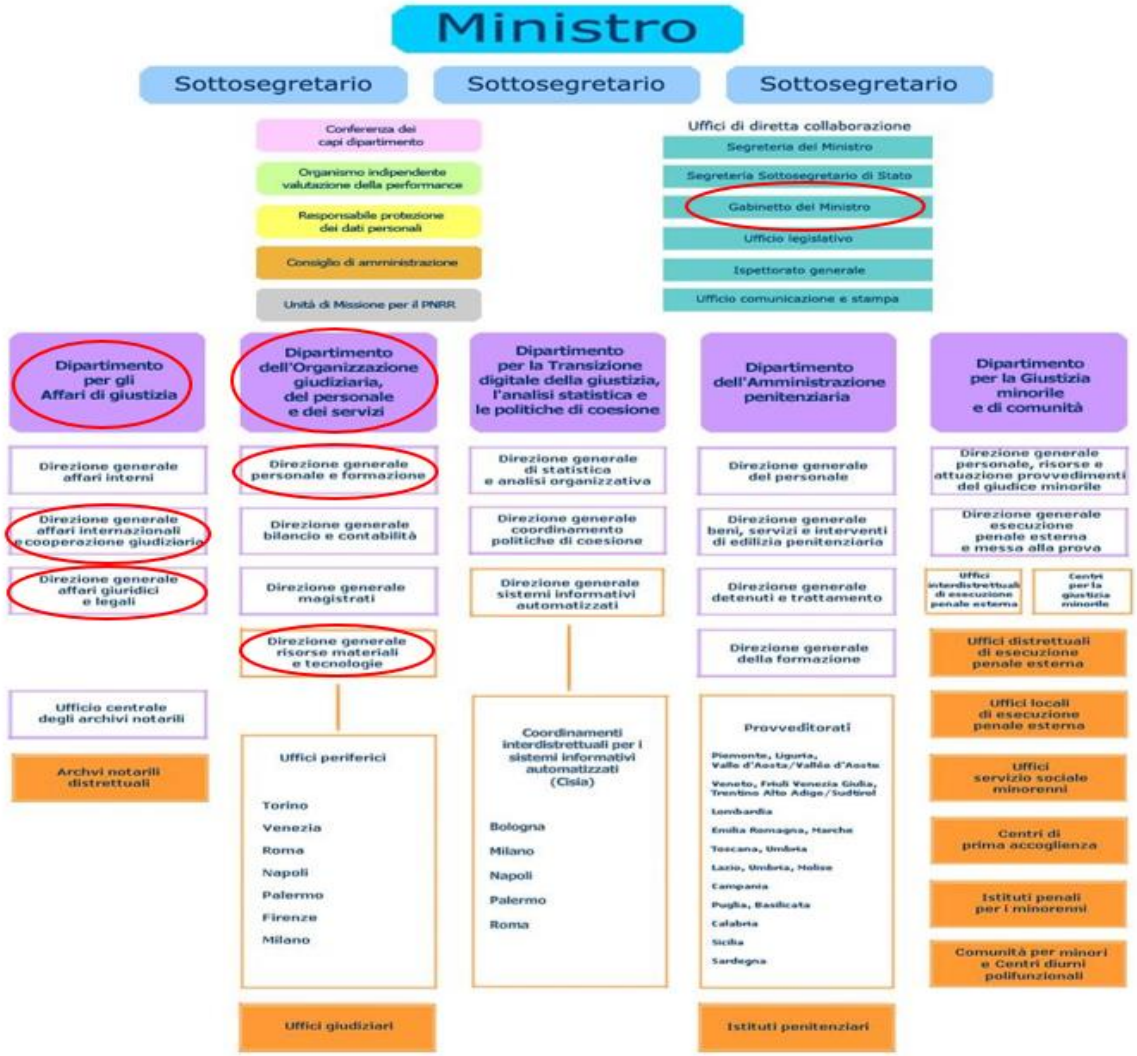


Figure 4.2 Organisation chart of the Ministry of Justice: in red circles the actors involved in the project. Extracted from: https://www.giustizia.it/cmsresources/cms/documents/organigramma_giustizia_10gennaio2023.pdf (consulted on 25 June 2024)

The process of gaining access to the Ministry of Justice took almost two years due to a number of unforeseen circumstances. Despite some changes to the planned activities and some delays, the experience proved to be an opportunity to establish positive relationships with employees of other departments. The idea of the research project was conceived after the pilot project conducted at

university in 2018 in collaboration with one of the linguists of the Ministry who also worked as a lecturer. My initial contact with the General Director of Office I occurred at the end of 2019. During the period of the global pandemic, initial contact with Head of Department was established online due to the imposition of lockdown measures. Furthermore, unexpected events necessitated the resubmission of the research project on three occasions. A series of online meetings were held with the IT department, the data protection supervisor, and the Head of Department with the objective of evaluating the potential risks to the Ministry. A suitable solution for the anonymisation of linguistic data had to be found. In order to obtain useful suggestions, I engaged in discourse with a number of experts and companies that are specialised in the development of anonymisation / pseudonymisation tools. Pseudonymisation was the most appropriate solution for the training of the NMT engine. This was subsequently approved by the Ministry of Justice. I had to evaluate potential tools to be used in the research project and negotiate agreements with companies to provide the tools free of charge for academic purposes (more details in Chapter 7). Then, in early 2022, the project was presented to the linguists at the Ministry of Justice and participants were enrolled in the research. The actual fieldwork began in April 2022 with training and ended in July 2023. This lengthy process proved beneficial in gaining insight into the working environment, management dynamics and interpersonal relationships between the participants. Conversely, there was a risk of conflating the objectives of the research project with the agendas and expectations of the management and participants of the Ministry. Consequently, it was necessary to devise a research plan that could simultaneously satisfy the academic and professional needs of the project (as detailed in Section 1.3).

4.6 The participants

All linguists working in the Ministry of Justice agreed to be involved in the research project. The 22 linguists who took part in the research were all recruited by the Ministry following a competition for interpreters and translators held in 1994. The minimum entry requirement was a diploma in translation and interpreting (now equivalent to a bachelor's degree following the 1999 reform of the Italian university system, MD 509/99) and knowledge of any two foreign languages from English, French, German and Spanish. The four-year degree (now equivalent to a Master's degree) was seen as an additional requirement for access to higher-level employment. In addition to language skills, the competition required knowledge of elements of criminal and administrative law. The written examination was designed to test passive translation skills in the main language only, while the oral examination included basic legal knowledge and a translation test in a second European language as well as an active translation test in the main foreign language. At the conclusion of the selection process, three candidates were selected for the more senior positions. Two of these candidates were appointed to the lowest-level position, while the remaining candidate was recruited at the same level of seniority as the others. No specific training was provided, and preparation was left to the linguists' own initiative. The candidates invested a significant amount of time in the archives, studying paper

documents in order to gain the required background knowledge. Table 4.1 presents a summary of the information pertaining to the 22 participants:

	Working languages	**Age**	**Professional experience**	**Years working at Ministry of Justice**	**Legal translation specialisation**	**Duties at the Ministry of Justice**
1	English, German	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	translator, proofreader
2	English, French	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	translator, interpreter, proofreader
3	English	61-70 years	over 25 years	over 25 years	working at the Ministry of Justice	translator, interpreter, proofreader
4	French, Spanish	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	Translator
5	English, German	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	translator, interpreter, proofreader
6	English, Spanish	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	translator, interpreter, reviser
7	English, French	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	translator, interpreter
8	English, German	51-60 years	over 25 years	over 25 years	law degree	translator, interpreter
9	English, Spanish	51-60 years	over 25 years	over 25 years	by chance	Translator
10	English, Spanish	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	Translator
11	French	61-70 years	over 25 years	over 25 years	working at the Ministry of Justice	Translator
12	English, French	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	Translator
13	English	61-70 years	21-25 years	21-25 years	working at the Ministry of Justice	Translator
14	French, German	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	Translator
15	English, German	51-60 years	over 25 years	over 25 years	Interpreter School	Translator
16	English, German	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	Translator
17	English, French	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	translator, proofreader, coordinator
18	Spanish	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	Translator
19	English, German	51-60 years	over 25 years	over 25 years	specific language courses, self-taught	Translator
20	English, French, Italian	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	translator, interpreter
21	English, French	51-60 years	over 25 years	over 25 years	working at the Ministry of Justice	translator, proofreader
22	German	61-70 years	21-25 years	21-25 years	training courses	Translator

Table 4.1 Information about participants

At the beginning, they all worked in the main office, in a translation department with a dedicated head of department (at that time a person with specific training as a linguist). In 2005, the unit was reorganised: the translation department was abolished, many translators were transferred to a second office, and they were all aggregated to the Criminal Affairs Department, without a dedicated head of department. The management of the translation workflow was delegated to one of the more experienced translators, who retired after a few years and was not replaced. So, in the end, translation management was delegated to three or four people who had no dedicated resources for the task, and the translators were divided into two groups in two different places. They carried out almost the same tasks, except that those at the main office were asked to do occasional quick turnaround translations.

They usually translated into both active and passive languages. Among the various documents they translated were: European Union forms, arrest warrants, certificates, judgments, orders and opinions of judicial authorities, sentence enforcement orders, answers to thematic questionnaire/questions addressed to the judicial authority by international bodies (OECD, EU, IMF, OSCE), office correspondence with judicial authorities, articles of law, international treaties and agreements. The linguists were well prepared to adapt to different terminology, style and register requirements depending on the type of document and the country of origin/destination, but the main problem was the formatting of the files. Some were so badly formatted that translators had to rewrite them from scratch, reproducing the layout of the original document, a very time-consuming activity not directly related to translation. Another task that unnecessarily burdened translators' day-to-day work was documents such as treaties and international agreements that contained parts that were identical to previous versions, requiring them to manually search through old translated files and then copy and paste.

Although they were highly specialised and experienced translators, their IT skills were mostly very basic. They had basic knowledge of Word (i.e. they did not use hidden text to format content, tables, images, lists, page breaks, headers and footers, footnotes, conversion of text to table and vice versa), email management systems and the Internet. They had no common instructions or place to archive translated documents, and they usually stored on their PCs only the translated versions of documents because the source documents were often in PDF, which could not be converted into an editable format for translation (Section 5.2). As a result, translators had to rewrite the entire document from scratch and spend part of their time formatting the final document. At the start of the fieldwork, they did not share any translation or linguistic resources (such as document repositories or glossaries) and did not see the need to improve their IT skills, only their linguistic skills. They did not have a common style guide or guidelines for the translation/revision process, and no revision cycle involving a revisor or another linguist who did not carry out the translation was performed.

Consequently, they did not receive feedback on their translations except in a few occasional cases (e.g. appreciation for a good translation from a foreign office or a judge), everyone worked according to their best judgement.

The design of the research was influenced by two key factors: the physical location of the translators and their division into two groups. The first group, comprising seven participants (Group A for the purposes of this study), was based at the headquarters of the Ministry of Justice, where they had close contact with the head of department, officials from other departments and IT staff for support. The participants were situated in the same room and alternated two days a week on four workstations, sharing the same PCs (four PCs for six translators), each with their own personal account. On the remaining days of the week, they were required to work from their own residences. One linguist from Group A was temporarily seconded to the Supreme Court. Each of the translators worked with two languages (between English, French, German and Spanish, active and passive translation), and it was rare for two or three of them to work together on the same assignment.

The second group, comprising 15 participants (referred to here as Group B for the purposes of this study), worked in a branch of the ministry, occupying an entire floor of a building that was separate from other departments. They had minimal contact with staff from other departments, and even less contact with their head of department. Furthermore, there was no IT office to support them; instead, they had to request support as required and book the intervention from the head office. Each individual was allocated their own workstation, with a maximum of two translators per room. They were afforded the flexibility to alternate between working from home and attending the office, without being constrained by the availability of workstations. In Group B, there were four translators whose exclusive remit was the translation of documents emanating from the European Court of Human Rights. In Group B, instances of urgent work were less frequent, and there was a greater propensity for individuals to work in pairs. Nevertheless, even in this group, there was a minimal sharing of activities, with the majority of work conducted individually.

4.7 Three-phase convergent parallel MMR design in the present study

In light of these circumstances, the research was designed to capitalise on and optimise the potential benefits of any apparent challenges. Given the nature of this research, the convergent parallel and multiphase design was adapted, using only some features of each approach to create a three-phase convergent parallel design with the following characteristics: quantitative (questionnaires) and qualitative data (face-to-face interviews, analytic memos) were collected concurrently at the same stage of the process (at the beginning, after 6 months, after 12 months) (Figure 4.4); each stage of the MMR had the same weight with the appropriate method (Likert-scale, open-ended questions, interviews and field notes); the data were analysed independently using approaches specific to each type of data (i.e. multiple choice response rates, theme development, etc.); and the results were only mixed in the final step dedicated to overall interpretation.

The design consisted of three phases, with the aim of training participants from the beginning and gradually introducing them to a variety of functions and tools, aiming at increasing their autonomy and confidence in translation technologies. This approach was intended to enable them to become proficient in the main translation technologies, including TBs, TMs and NMT. The participants were involved in the entire process of collecting and preparing linguistic data from the outset. The ultimate goal was to train an NMT engine and apply the principles of augmented translation (Section 5). Given the similarity of the linguists' professional characteristics and IT skills, the multiphase approach allowed me to stagger the implementation of the activities with the two groups by about three months in each phase. I started with Group A first, carried out the planned activities for each phase, collected quantitative and qualitative data at the end of the phase, and then, using the experience gained and making minor adjustments where necessary (described in more detail in Section 5.3), I carried out the same activities and data collection with Group B. This staggered and multiphase design allowed time and effort to be optimised. Not only was it possible to make small adjustments (e.g. in the design of the training, in the use of the programmes), but also to verify the training needs, the IT requirements, the characteristics of the documents and to become familiar with the internal procedures.

The initial phase focused on tool training to ensure the acquisition of basic knowledge (for details about the training see Section 5.3). The subsequent phase involved mentoring to aid in adapting the tools to individual needs and creating personalized workflows. Finally, in the third phase, observation of the implementation and outcome of the adopted translation technologies was conducted once the participants became more autonomous.

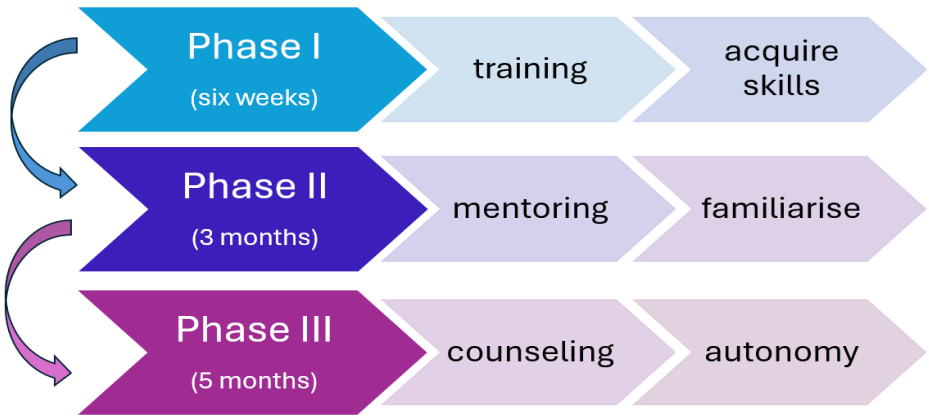


Figure 4.3 Three phase design of the present study

The findings and experience gained in the first phase were used to adapt some elements in the second phase (i.e. training elements, technical issues, timing of mentoring, emerging factors to be investigated with in situ observation), and in the third phase all the information and experience gained

in the first two phases were used to help all the participants reach a common goal to verify the outcomes of the interaction between human and non-human actors.

The case study described by Delaney et al. (2016) proved a fruitful source of inspiration for the design presented above, given the similarity of many characteristics of the research. In fact, they report a four-phase convergent parallel mixed methods design applied to empirical research with the purpose of investigating and evaluating the development of ten management skills of ten managers. The researchers had the chance to confirm that the MMR, based on the theoretical paradigm of pragmatism in a multiphase convergent parallel design, is an appropriate instrument for conducting workplace research with a limited number of participants and a variety of factors to be correlated. The scope of their study is analogous to the present research. Indeed, they investigate the interrelationship between perception, skill development and social interaction, employing a range of techniques, including focus groups, questionnaires and in situ observation. By merging the two designs developed by Creswell et al. (2011) (i.e. multiphase design and convergent parallel design), they were able to merge and link quantitative and qualitative data across different phases simultaneously. “This strategy provides a clear framework to show how the research questions can be answered. […]. Qualitative and quantitative approaches carry equal weight; the data will be retained separately during the analysis, and only merges at the interpretation stage” (Delaney et al., 2016, p. 410). As stated in the report, this approach helped the researchers to gain different perspectives to answer the research questions: the quantitative data provided information on the development of skills, while the qualitative data provided information on the personal development of the participants. As a result, the multiphase convergent parallel design approach was useful for the mutual validation of the two sets of data.

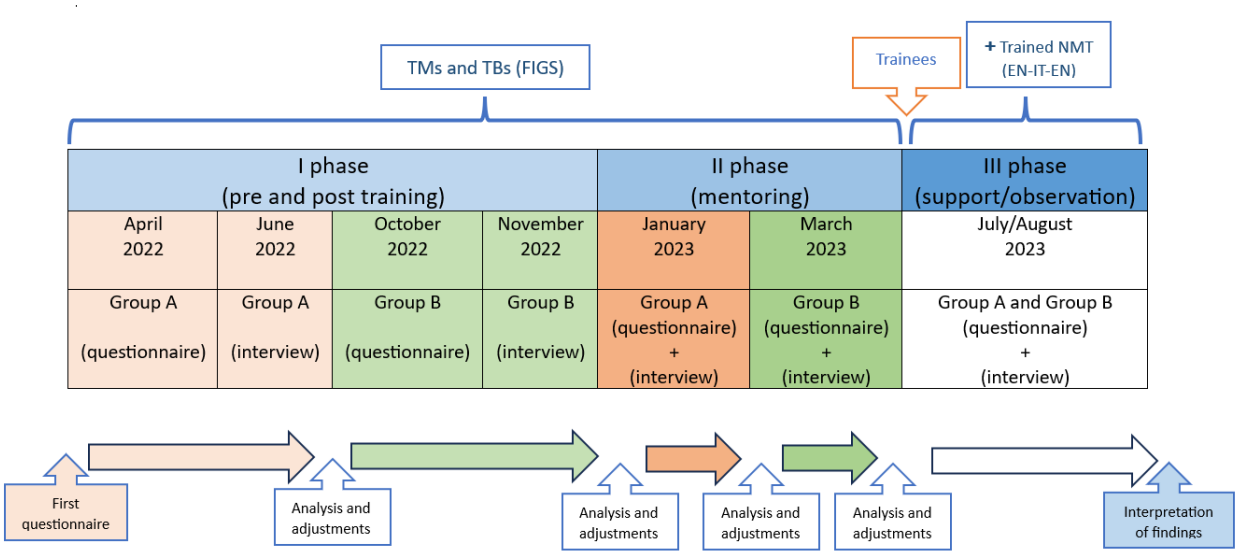


Figure 4.4 Timeline of research design, data collection and analysis

Figure 4.4 outlines the timeline of the fieldwork that started in April 2022 and ended early in August 2023. This research design was also useful to overcome difficulties caused by external events that affected the research plan (e.g. absence of participants due to illness, or office accessibility issues) and to gain a different perspective on the factors related to some of the main independent variables (i.e. the translators' agency and interpersonal relationships), giving me the opportunity to gain a broader perspective on the dependent variables (satisfaction, motivation and attitude).

In the third phase of the multiphase approach, that began in April 2023, five university students (one for each working language) were introduced to the research project to help the participants prepare (i.e. align and clean) the linguistic data (at least 1 million words were needed for the first training iteration). In this phase, I had a dual role: I followed the university trainees as a tutor; and I devoted more time to observation in the Ministry, since my intervention was reduced to occasional suggestions and support on specific technical issues (i.e. integration of TBs, TMs and NMT in the same working environment, definition of criteria for evaluating the trained NMT engine) (more details in Chapter 7). The two groups worked together in parallel, sharing linguistic data and skills acquired by all of them to reach a common objective and test an additional technological element (NMT integrated in a CAT tool). In this final phase, a novel phenomenon emerged as a result of the spontaneous aggregation of a subset of participants from each group.

During the 12 months of research, the main activities I carried out to introduce technologies in the Ministry of Justice and perform the first training of a customized NMT engine were (Table 4.2):

Phase I	Training (approx. 50 hours divided over 2 groups)
	Collaboration with the IT group to resolve some technical problems (file formats, recovery of old translations, network access restrictions, etc.)
	Meetings with the Head of Department, the Data Protection Officer, the Digital Innovation Office, the Financial Planning Office (to discuss the potential and possible developments of the projects, the risks for data protection, and gather information on the estimated costs)
	Meetings with software developers and machine translation experts for advice and solution finding
Phase II	Creation of translation memories for French, Italian, German, Spanish (FIGS) (passive and active combinations)
	Creation of glossaries for FIGS
	Mentoring (approximately 6 months divided between 2 groups)
Phase III	Trainees tutoring (3 months)
	Technical support to participants (in presence, via e-mail or by phone)
	Linguistic data preparation and cleaning

	Training of an NMT engine

Table 4.2 Main activities performed in the research intervention across the three phases

4.7.1 Training, mentoring and consulting: human at the core

In consideration of the objective of the present research, the level of IT competencies of the participants, and the necessity to provide training on the job, it was imperative to devise a plan that could provide the participants with the necessary knowledge of translation technologies, in addition to providing support in their daily activities (Poulsen, 2006; Stone, 2007; Westeegaard, 2017). This would allow them to familiarise themselves with the new tools while changing their working habits and integrating technology into their working practices.

The new element that was introduced with the intention of supporting and reinforcing the training phase was one-to-one meetings with each participant. The purpose of these meetings was to observe their way of working, listen to their doubts or curiosities, and assist them in adapting the tools and new skills acquired to improve their daily activities. The objective was to ensure their comfort with the change. The intervention was also designed to address potential obstacles that could hinder the adoption of these technologies (e.g., minor issues with the software, unclear functions, uncertainties in tool usage etc.).

The fundamental distinctions between training, mentoring and consulting can be outlined as follows:

Purpose - Training, mentoring, and consulting all served to improve the daily activities of the participants, but they each had distinct purposes:

- Training facilitated the acquisition of specific knowledge and skills by the participants.
- Mentoring facilitated the enhancement of skills in accordance with the IT competence level of the participant.
- Consulting facilitated the acquisition of problem-solving abilities and autonomy among participants in relation to the adaptation of translation technologies to meet their specific needs.

Approach - Training, mentoring and consulting required different approaches according to the different phase of the research project:

- Training was a more structured, trainer-led process that was limited in time (4-6 weeks).
- Mentoring was a more informal and relational approach to learning that required more time than training (about 3 months).
- Consulting was a collaborative and goal-oriented approach that required more time than mentoring (about 6 months).

Method - Training, mentoring, and consulting required different methods according not only to the level of competences but also to the kind of interpersonal interaction with participants:

- Training involved teaching and instructing groups of 7 and 15 participants.
- Mentoring involved listening to and observing participants in one-to-one meetings and providing advice and guidance according to their needs.

- Consulting involved an individual or a small group of participants (depending on the working language or the activity to be carried out) to give advice on specific situations and was more goal-oriented to develop strategies and overcome obstacles.

Positionality - The positionality changed according to the role I had at each phase: outsider as trainer, insider as mentor and 'betweener' as consultant (Section 4.10.3)

Expected outcomes - Training, mentoring and consultancy aimed at achieving different, incremental goals to support participants through the various learning stages, from knowledge acquisition to complete autonomy in the use of translation technologies to find a sustainable workflow.

The following is a brief overview of the distinctions between training, mentoring and consulting:

	Training	Mentoring	Consulting
Purpose	Provide skills and knowledge	Provide guidance to improve skills according to participant competence level	Provide advice to achieve problem-solving abilities and autonomy
Approach	Structured and directive	Long-term and relational	Collaborative and goal-oriented
Methods	Instruct, teach (in group)	Listen to participants, make suggestions according to their needs (one-to-one)	Observe, analyse, advice (small groups and one-to-one)
Positionality	Trainer as outsider (hierarchical relationship)	Mentor as insider (non-hierarchical relationship)	Consultant as betweener (non-hierarchical relationship)
Expected outcomes	Learn how to use tools	Adapt tool features to meet professional and personal needs	Sustainable workflow Decide when, how and which tools to use

Table 4.3 Difference between training, mentoring and consulting in the research intervention

4.8 Data collection

Data was collected using questionnaires and face-to-face (aside from some carried out online due to the COVID emergency) interviews at three different time points, with the same schedule for both groups. The first questionnaire was administered before the start of the training, followed by the first interview after the training. The second questionnaire and second interviews were conducted after the mentoring period, and the third questionnaire and third interview were conducted at the end of the research project. The data collection for Group B was shifted by approximately three months

after that of Group A. Only the third data collection took place over a one-month period for both groups due to summer holidays.

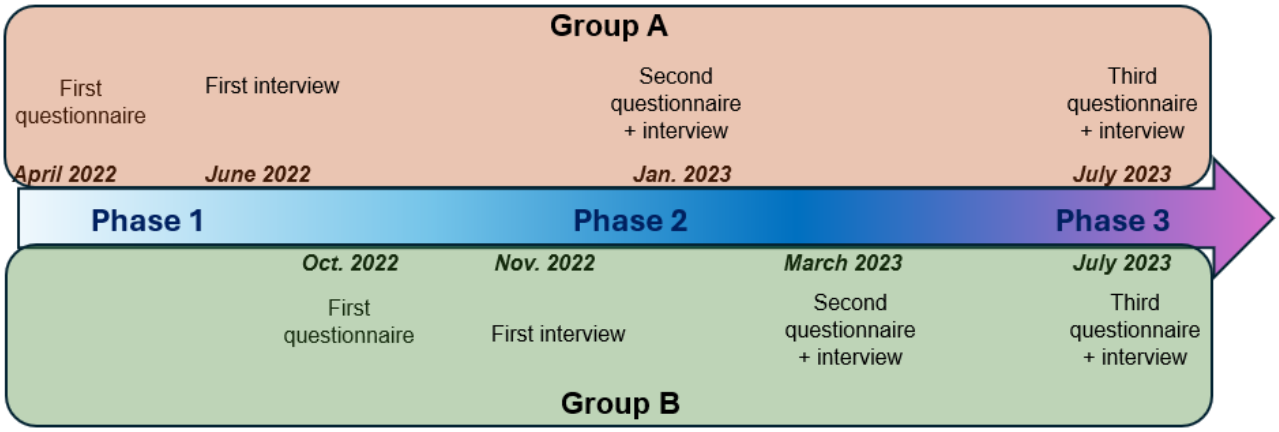


Figure 4.5 Timeline of staggered data collection, Group A and Group B

The training and mentoring processes were completed in a shorter timeframe in Group B, due to the experience gained in Group A and the absence of the summer vacation period. Additionally, the constraints imposed by the ongoing pandemic had diminished by the time Group B commenced its training and mentoring activities. Another important variable from a technological point of view was the fact that, due to time constraints, it was possible to train only the NMT for the EN-IT and IT-EN language combinations with the minimum number of words recommended to customize an engine (1 million words). The NMT engines for the remaining FIGS languages were trained with an insufficient number of words to achieve a significant improvement in the quality of the output as reported by the translation edit rate (TER; Snover et al. 2006) score of MTStudio (the tool used to train and automatically evaluate NMT engine improvement) (Section 5.2). This is important for the third phase of the research project (integrating the use of TMs, TBs and NMT) because it could have had an impact on Group B, where not all linguists worked with English and, consequently, they were able to test only partially customised NMT engines for other languages.

The elements that varied across the three phases of the research project were:

- the level of competence of the participants in the use of translation technologies (initially acquired through training and later through mentoring);
- the increasing impact of translation technologies on the working methods of the linguists (starting in the first phase with the use of TMs and TBs and some basic functions of the programmes, to the third phase with the integration of TMs, TBs and trained NMT in one single environment) (see teaching method and structure in Section 5.3);
- the acquisition of more information about the risks associated with the use of NMT;

- the involvement of university trainees who helped the linguists to prepare the linguistic data for the first NMT training;
- the involvement of other offices that do not deal specifically with translation, but with various ancillary issues related to the introduction of translation technologies in a work environment (e.g. the IT Office, the Data Protection Officer, the Digital Innovation Office, the Financial Planning Office);
- the change in the overall management of the Ministry of Justice and the uncertainty related to the possibility of completing the research project as planned.

The above elements had a direct or indirect impact on the participants and their relationships and influenced their motivation to adopt translation technologies in their daily activities. In the present study the methodological design was primarily adopted to triangulate the results and make small adjustments in each phase of the research. The study covers a long period of time and introduces new actors, such as the translation technology and me as a researcher in the role of trainer and consultant, into the network of participants (Section 3.3.4). This generates a series of changes that affect the existing balance of the participants' working environment. Furthermore, this opportunity afforded me the chance to engage in the day-to-day activities inside the Ministry of Justice while fostering valuable connections with individuals outside of the immediate research participants. The collaboration with two additional departments proved to be highly beneficial for the proper development of the whole study when the project faced the risk of abrupt interruption due to a change in head of department. The questionnaires and interviews prepared before the start of the fieldwork had to be adjusted from phase to phase in order to investigate the impact of these unpredictable elements, and the data collected in the analytic memos helped to complement and integrate the results of the questionnaires and interviews.

At each phase quantitative and qualitative data was collected and analysed separately. Quantitative data is collected through five-point Likert-scale questionnaires whereas qualitative data is collected through face-to-face interviews and in situ observation (see Appendix D for questionnaires and interviews questions).

4.8.1 Questionnaires

Questionnaire was the method adopted in the present research to collect quantitative data, in particular a questionnaire for each phase of the research, delivered according to the above-mentioned plan.

The aim of the first questionnaire (Appendix D) was to gather information about the participants (demographic data, professional experience, technical expertise etc.), the working environment, their attitude towards technology and their job satisfaction. The analysis of data collected in this first questionnaire helped to define the zero point of the research and was used as a baseline for the second one that was delivered when the translators had acquired minimum technological skills in

the second phase. The questionnaire was divided into three parts (50 questions in total), the questions were numbered in sequential order, and it took about 15 minutes to be answered. All these details were described at the beginning of the questionnaire to reduce anxiety and help linguists have more control over the activity.

In the first part there were 20 questions: eight multiple-choice questions, four yes/no questions and eight open-ended questions. Multiple-choice and yes/no questions were used where possible to reduce the effort required by the respondent and focus on data like age, education, number of years working in the Ministry of Justice, working languages and technical expertise. The open-ended questions focused on better describing daily activities and how they were carried out (type of documents translated, volumes, knowledge of machine translation or use of technologies etc.), and there was also one open-ended question about motivation (11: List the top three things that motivate you the most in your work).

In the second and third parts there were 30 Likert scale questions in total (15 in the second and 15 in the third). The questions required respondents to express the degree of agreement or satisfaction on a scale of 5 points (from strongly agree/satisfied to strongly disagree/dissatisfied). The option “don’t know” was included in order not to compel respondents to give an answer. All statements/questions were formulated in a positive or affirmative form, no negative statements or questions were used to avoid the risk of invalid answers due to misunderstanding, as also reported in a recent study by Chyung et al. (2018): “a majority of research studies we reviewed recommend against mixing positively and negatively worded items in a survey as it can create threats to validity and reliability of the survey instrument” (ibid, p. 8). In order to ensure the ecological validity of the study, the questionnaires and interviews were conducted and subsequently analysed using the participants' mother tongue (Italian), despite their professional-level knowledge of English. "Cultural differences might also impact the level of formality and the way questions are asked in general" (Ehrensberger-Dow et al., 2023, p. 401). The data were then accurately translated into English by me, with the objective of preserving as much as possible the linguistic nuances.

The first questionnaire was proposed at the beginning of the first training session in situ, and, to reduce the impact for participants, it was made available as an online anonymous survey in Google forms. Before the questionnaire, participants were provided with a detailed description of the phases of the research and aim of the project in which they would have been involved as volunteers and, after expressing their consent to take part in the research, they were asked to sign the Informed Consent Form and the Plain Language Statement (provided with research ethics approval in Appendix B and C). The questionnaire was administered during the hours dedicated to training in order not to impact too much on their daily activities, and in the end this decision had another advantage. Although the questionnaires and interview questions were submitted not only to my supervisors, but also to fellow teachers and translators for assessment of their intelligibility, clarity,

and potential for causing discomfort, answering the questionnaire together in an open space reduced the risk of having invalid answers because linguists had the opportunity to request clarifications about questions that could have been misunderstood. This aspect was particularly important considering the small number of participants and the need to gather as much valid data as possible.

The second and the third questionnaires (Appendix D) were made up of 35 total questions: 32 Likert scale questions and three open-ended questions. These two questionnaires were built adapting the instrument created by Rodríguez-Castro (2015) to measure translators' motivation and job satisfaction, Herzberg's theory (1966) on job content factors representing the "motivators" (i.e., translation technologies in this study) that could affect positively job satisfaction and motivation, the survey elaborated by Rossi and Chevrot (2019) to analyse translators' perception and how it can influence performance when using translation technologies, analysis of users' perception, technology usability scale and technology fear index (see Chapter 3).

4.8.2 Interviews

Qualitative data were collected using interviews (Appendix D) according to the principles of an active interview approach, as defined by Holstein and Gubrium (2012). This method positions both the interviewer and the respondent as active participants in the process of articulating ongoing interpretive structures and practical reasoning. Both interviewer and interviewees are understood to co-construct the interview text, therefore the researcher could have influence (albeit unintentionally) on the data collected as well as on the attitude of participants towards the questions. Quantitative tools might not be able to catch the complexity of the situation or experience under investigation as represented in qualitative data.

The aim was not to simply obtain factual information, but rather to delve into the participants' interpretations and perspectives, in line with the qualitative nature of the research (Warren, 2001). Qualitative interviews are instrumental in eliciting nuanced insights, as participants are viewed as meaning makers, contributing to the construction of knowledge rather than merely reporting information (Holstein and Gubrium, 1995, as cited in Warren, 2001). The questions posed in the interviews were meticulously designed to facilitate meaningful dialogue with participants and to capture the intricate nuances that are essential for an in-depth exploration of the research topic. This approach enabled the elicitation of perspectives and information that could not be readily accessed through the questionnaires (Johnson and Rowlands, 2012).

Furthermore, qualitative interviews are well suited for ANT-informed studies as they allow for the exploration of the dynamic interplay between social actors and the networks they form (Inghilleri, 2009). The questions were also based on Risku's (2020) theory that the translation process is also influenced by technological and social factors (see Chapter 2).

The first interview consisted of four questions aimed at assessing attitude and expectations in relation to translation technology following the first training phase.

The second interview consisted of seven questions designed to evaluate the impact of translation technologies on their daily activities, the level of satisfaction and frustration experienced by participants, as well as their expectations and motivation to continue with the project.

The third interview consisted of eight questions that not only retested the previously covered aspects to assess their evolution over time, but also evaluated the skills acquired and their application in daily activities. Additionally, the interview evaluated the participants' attitude towards technologies and the intervention in which they had participated.

At the request of the participants, the interviews were not recorded. However, the speech-to-text functionality was used to allow interviewees to review their answers in real-time and decide what to keep or delete.

4.8.3 Analytic memos

In addition to questionnaires and interviews, the study also collected qualitative data through analytical notes, following the guidelines of Saldaña (2016) and Gibbs (2018). Impressions, thoughts, and observations were recorded as side-notes in a 'stream-of-consciousness' style. Additionally, a detailed log of all training sessions, meetings (not only with the participants but also with department heads and Ministry of Justice staff), and mentoring sessions was kept. The original plan was to document the study through a diary and field notes. However, it became apparent during the initial meetings that taking notes while working with the participants was a distraction that created unease and curiosity among the linguists. This risked having a negative impact on the working group and the relationship being built with the participants. During the fieldwork, a brief note-taking process was employed to serve as a prompt for subsequent writing. This ensured efficient and accurate documentation of the sessions. Analytic memos were used not only as a way of releasing one's thoughts during data analysis but also as a means of managing the transfer and maintaining a clear and objective perspective towards the end of the fieldwork. My role as a researcher took precedence over the role of mentor, especially when the relationship with some participants became closer. This reflects exactly the definition provided by Saldaña (2016, p. 44) that described analytic memos as "a place to ‘dump your brain’ about the research participants, phenomenon, or process under investigation by thinking and thus writing and thus thinking even more about them", suggesting also to manage them as data to be coded and categorised. Writing analytic memos was a good strategy to keep track of the research, review steps done and adjust those to be done, organize ideas during the data collection and interpretation without losing sight of the goal to be achieved.

4.9 Protecting anonymity and confidentiality of participants

In order to mitigate potential harm to participants, researchers must maintain anonymity and confidentiality of those involved in the study, thus preventing unauthorized access to unredacted data (Gibbs, 2018). Maintaining confidentiality requires avoiding deductive disclosure or inadvertent breaches of internal confidentiality, as highlighted by Kaiser (2012). The researcher's awareness that

divulging individuals' experiences, personal details, or verbatim statements can inadvertently expose their identities is emphasised. Mellinger (2020) recommends the use of pseudonyms or numerical codes throughout the research process, including the dissemination of findings, as a means of safeguarding anonymity and confidentiality. However, achieving a balance between data anonymisation and preserving the dependability of the data can be challenging, as noted by Winiarska (2017). In order to safeguard the anonymity of participants, questionnaires and transcriptions were anonymised, and specific details were altered, in accordance with the ethical standards of the research project.

4.9.1 Data management and preservation

Research data is typically deleted after a designated timeframe. However, some scholars, such as Gibbs (2018), argue for the preservation of qualitative data to maximize its utility and broader impact. This perspective highlights the valuable contribution of participants' committed involvement in generating qualitative data. However, to ensure strict protection of participants' confidentiality and anonymity, it is recommended to retain such data in formats like document, image, or video files, as emphasized by Gibbs (2018). This facilitates the retention of data while maintaining confidentiality. Furthermore, Gibbs recommends depositing these files into a specialised archival system specifically designed for this purpose. This approach not only ensures the integrity of the data but also enables its accessibility for potential future re-analysis or utilisation by other researchers, thereby potentially extending the impact of the original study.

I addressed the above issues and sought approval from the Research Ethics Committee (REC) of Dublin City University (see Appendix A for REC letter of approval).

4.10 Approach to data analysis

In the approach to analysing the data collected, it was essential to strike a balance between the subjectivity of the researcher, the key concepts identified as relevant to the research focus of the project according to the supporting theories underlying the design of the questionnaires and interviews, and the subjectivity of the participants and their genuine opinions (Braun and Clarke, 2019). Although in research the data collected must tell the story, Glesne (2016 cited in Derrington 2019, p. 81) describes the researchers as "cocreators of the story reflecting on their experiences, feelings, and interactions with participants and the research site". In this perspective, researchers are actively engaged, reflective, and interactive while collecting and generating data and conducting the analysis, not only data collecting "instrument" but also "the word cruncher" (Saldaña, 2003, p. 46). They must "rigorously analyse and interpret primarily language-based data records to describe credibly, vividly, and persuasively for readers through appropriate narrative the processes of participant change through time" (ibid.).

The three-phase convergent parallel mixed methods design adopted for this research provided essential flexibility to follow the evolution of the unpredictable events of this workplace study, but at

the same time posed a challenge in adopting the right method to analyse the quantitative and qualitative data, particularly at the coding stage. In their studies, Braun and Clarke (2013) and Ravitch and Mittenfelner Carl (2016) highlighted that the nature of qualitative data analysis is iterative and recursive, and particularly in studies conducted over a long period of time, the initial informal analysis of questionnaire and interview data could take place during the data collection phase, before the more structured and in-depth analysis conducted by the researcher after the completion of the field phase research (Alfoldi and Hassett 2013). In addition, Creswell et al. (2007) emphasise that qualitative research questions have the potential to evolve throughout the research process. Initially, questions may be tentative and open-ended, but as researchers delve deeper into the topic, they may become more refined and specific. This dynamic nature of qualitative research requires flexibility and implies that the study cannot be completely predetermined or fixed in advance.

4.10.1 Data analysis method: reflexive TA

A reflexive TA proved to be the most appropriate method to generate initial themes and to develop them using first a deductive and then an inductive approach. TA can be seen as a broad term that encompasses different approaches, rather than a single qualitative analytical approach. TA includes the following main approaches: the coding reliability approach, the codebook approach and the reflexive approach (Braun & Clarke, 2013, 2019b, 2020a). Mixed methods workplace research, based on a pragmatist philosophy, incorporates action and reflection as reported by Flynn (2022) and supports an interactive method of inquiry in which the researcher engages personally with the case (Hyett et al., 2014). This approach to TA stresses the reflexivity of the researcher and is highly flexible, emphasising the active involvement of the researcher in coding and theme generation. The researcher not only identifies explicit themes and summarises the data, but also looks for implicit themes that reveal the underlying ideas in the data (Braun & Clarke, 2019). The researcher's subjectivity is the primary tool for reflexive TA because, unlike coding reliability TA and codebook TA, it does not require the researcher to rely on a structured codebook created before analysis begins or immediately after an initial coding of few data. Rather than being a problem to be managed or controlled, subjectivity is seen as a valuable resource for research (Gough and Madill, 2012; Braun and Clarke, 2019). This study focuses on the ways in which participants perceive and interpret their subjective experiences, rather than objective reality.

Quantitative data was employed as a guide to identify the central concepts expressed by participants in relation to the areas under investigation. This approach facilitated the creation of a domain skeleton, which functioned as a foundational starting point for discerning patterns within the data from the interviews. This process enabled the identification of themes, as outlined in Section 7.1.

The triangulation of the findings obtained with quantitative and qualitative data in each phase, in combination with the reiteration of data analysis required by TA and the need to translate interviews

from Italian into English, served as a counter-evidence measure in order to avoid biases originating from personal prejudices and the results expected to be found.

In the context of reflexivity, it is essential to note that the meticulous documentation of each meeting or event related to the study, in conjunction with the analytic memos and the regular meetings with my supervisors that addressed the progression of the fieldwork, played a pivotal role in facilitating my maintenance of a self-critical account of the research process (Tobin and Begley, 2004). I recorded and shared with my supervosors also my personal reflections, doubts and uncertainties ("the human instrument", Lincoln & Guba, 1985). In addition, the regular batch deliveries of written work (approximately 2,500 words each) and the subsequent written feedback from my supervisors were instrumental in identifying any potential unclear steps in the research plan or deviations from the original objectives. Furthermore, during various phases of the research process, I consulted with colleagues who had professional experience with the introduction of translation technologies (e.g. Bank of Italy), the workplace (e.g. Translated) or field research (e.g. Hanna Risku).

In order to establish methodological rigour and thus ensure trustworthiness, the Four Dimension Criteria (FDC) by Linonln and Guba (1985) were applied to the MMR design of the present research: credibility, transferability, dependability, and confirmability.

The *credibility* of qualitative data, which is equivalent to the notion of validity in quantitative data, is established when data collected is accurate and representative of the phenomenon under study. In the present research, the prolonged engagement of the longitudinal study, constant observation, and triangulation of qualitative and quantitative data collected via interviews and questionnaires, respectively, served to meet this criterion. The *transferability*, or generalisability in quantitative data, is defined as the extent to which the findings can be applied to a similar context, as opposed to a broader context. The careful description of all three phases of this study is intended to fulfil this criterion. *Dependability* is like reliability in quantitative studies, and it refers to an exhaustive description of the study procedures and analysis, with the objective of enabling the study to be replicated. The possibility of ensuring dependability can be facilitated through the implementation of rigorous data collection techniques and well-documented analysis (a principal objective of the present study's supervisors). *Confirmability*, or objectivity in quantitative studies, is the process of guaranteeing that the data and findings are not due to the participant or researcher bias, thereby ensuring that the researcher's interpretations and findings are clearly obtained from the data. It is generally achieved when all the other criteria are met and when data are checked and rechecked throughout data collection and analysis (making it repeatable by others). A clear coding schema can be used to document confirmability by identifying the codes and patterns in analyses. This technique is called an audit trail, and it can also be ensured through triangulation or reflexivity (Braun and Clarke, 2019a).

Subjectivity without reflexivity can have limitations, but if the researcher is aware of his/her role and impact, subjectivity can serve as a valuable resource. In this study, I was personally connected to the study population, first as a trainer and later as a mentor, becoming almost a colleague at the end of the project when I participated in the drafting of the petition prepared by the participants to have the Ministry of Justice purchase the licences of the translation tools. This personal involvement in the development of events up to the final results of the fieldwork conducted with the linguists facilitated the dialogue with the interviewees and fostered mutual trust. Reflexive TA is particularly useful in such a context because, according to this approach, codes are not predetermined or fixed, but "can evolve, expand, contract, be renamed, split apart into several codes, collapsed together with other codes, and even be abandoned as a result of the researcher's reflexive interpretation of and deep engagement with data" (Braun and Clarke, 2019b, p. 7). As a result, the themes captured by the codes created using this approach provide a "clear, coherent and compelling stories about the data" (Braun and Clarke, 2013, p. 249). An essential element that distinguishes reflexive TA from the other two approaches is that the themes and codes always remain distinct at two levels (ibid.).

4.10.2 Difference between themes and codes

According to Braun and Clarke (2019b), in reflexive TA, a theme reveals a recurring pattern in the data, built around a central concept that regulates the analytical observations. A theme generally represents the different faces of the same idea, like a "multi-faceted crystal" (Braun et al. 2019, p. 12), revealing a common pattern in the data, and they are used to address the RQs or investigate a particular issue. In this perspective, a potential risk is to create themes using the interview questions (Clarke and Braun, 2013). In fact, Braun and Clarke (2006) make a distinction between a theoretical TA (top-down) guided by RQs or main research focus, and a data-driven inductive approach (bottom-up) (Section 4.11.3). On the other hand, a code is a more specific unit that helps the researcher to create initial themes, as it represents a facet and captures a single concept in a segment of data. A code is more of a concise label, consisting of a few "one-dimensional" and "meaning-thin" words (Braun and Clarke 2020a, p. 13), that highlights elements of interest because they relate to the RQs. The combination of multiple codes forms a theme in the recursive process of reflexive TA. In the present research, data were not simply summarized and organized, they are analysed according to the approach of Braun and Clarke (2006) that identify two levels of themes: semantic and latent. Semantic (or explicit level) themes "[…] are identified within the explicit or surface meanings of the data and the analyst is not looking for anything beyond what a participant has said or what has been written" (2006, p.84). The latent level goes further than the semantic content "to identify or examine the underlying ideas […] shaping or informing the semantic content of the data" (ibid.). The themes were created at both levels, exploiting the advantage of having quantitative and qualitative data, and following Braun and Clarke's notion that a theme is not a pre-constituted element to be captured in the data but is "actively created" by the creativity of a researcher engaged with the data (Braun and Clarke, 2016, p. 740). One of the criticisms made against this method of analysis is related to

dependability, because the creation of themes derived from a large amount of data could give rise to a variety of different interpretations. However, the recursive method and utilisation of quantitative data to guide the delineation of themes in this study have enhanced the dependability of this form of analysis, thereby compensating for any potential biases arising from subjectivity on the part of the researcher, thus ensuring that the analysis remains aligned with the primary research questions (RQs). The mixed-methods approach was also adopted to mitigate the other criticism raised by Bazeley (2009) that the TA might rely too heavily on participant quotes rather than rigorous processes of data analysis.

4.10.3 Reflexivity and positionality: finding a balance between insider and outsider position

Warin (2011, p. 811) defines reflexivity as 'an inter-dependent awareness of how I as a researcher am influencing my research participants' perceptions and a simultaneous and interdependent awareness of how they are influencing me'. Reflexivity assists researchers in critically reflecting on 'the kind of knowledge produced from the research, how that knowledge is generated' (Guillemin and Gillam, 2004, p. 274), while concurrently identifying and acknowledging the effects of their personal impact on the research process and findings, thereby maintaining the ethics of the relationship between researchers and participants. This approach enables the monitoring and mitigation of potential biases that may arise during the data interpretation phase, stemming from the researcher's personal perceptions and cultural standards (Dhillon and Thomas, 2019).

Positionality is defined as the worldview and standpoint of the researcher when conducting research (Rowe, 2014). It also refers to the relationship between the researchers and the research participants, and 'reflects the position that the researcher has chosen to adopt within a given research study' (Savin-Baden and Major, 2013, 71). The researcher's position exerts a significant influence on the nature of the research undertaken, the manner in which it is conducted, and the subsequent findings (Rowe, 2014) and it refers also to how the researchers ‘view themselves and are viewed by others: as an insider or outsider, someone with power or who feels powerless or coming from a privileged or disadvantaged situation’ (Ozano and Khatri, 2018, p. 191). In the present research I adopted a similar perspective to that of Yip (2024), proposing that the position of the researcher, whether insider or outsider, is not static and separated, but rather, is fluid and ‘situated within a continuum’ (ibid., p. 223). My positionality changed according over the three phases of the fieldwork, according to the role I had: I was an outsider in Phase I as a trainer (we worked in group during the training meetings); I became an insider during the mentoring period in Phase II (I was able to establish one-to-one relationships with each participant), when I exploited my experience as professional translator and project manager, I was more a colleague than a trainer and I worked in the ministry two or three days per week (collaborating with people from other departments too); I was a ‘betweener’ in Phase III when participants became more autonomous but I was still supporting them in-person and remotely, and I was partially involved in the realm of bureaucracy, specifically the acquisition of tool licenses. One of the most challenging aspects of this shifting positionality was

the divergent perspectives of the participants and the researcher. The participants expressed interest in how they could benefit from my insider status, while I had to manage the risk of searching only for the answers I expected without probing deeper into the responses (Shah, 2004). The insider position was advantageous in eliciting more candid opinions from participants (Katyal and King, 2014) and ensuring the engagement of all participants throughout the entirety of the fieldwork. In addition to the personal relationship that was established among us, there was a 'balance of power' (Yip, 2024, p. 229): I possessed knowledge about translation technologies that they required to enhance their professional performance, and they had professional experience and linguistic knowledge to customise and evaluate the NMT engine.

4.11 Bottom-up approach in this study

In the present study, the concept of *bottom-up approach* is used in two different contexts:

1. bottom-up approach as a model to introduce technology innovation in an organisation (defined as bottom-up^{TEC})
2. bottom-up approach as a method of qualitative data coding (defined as bottom-up^{COD})

4.11.1 Bottom-up approach and technology innovation (bottom-up^{TEC})

The top-down and bottom-up approaches (Figure 4.6) are general concepts that can be applied to various fields, such as product design and development, computer science, neuroscience, psychology, education, management, organisation, or public health. In the field of socio-technical innovation, Torres (2018) reports that the top-down approach promotes the development of ideas and initiatives by senior management or research and development centres of large companies who define objectives and allocate funds. The traditional approach to innovation activities considers managers as the sole decision-makers in the organisation, relying on the knowledge of experts without necessarily being informed about the needs of real users (Stein, 2012).

On the other hand, the bottom-up approach focuses on the power of employee ideas and initiatives. This approach involves everyone in the organisation in the innovation process, as it is about identifying people's needs in order to design the project (Stein, 2012), and employees are encouraged to share their ideas as part of a bigger picture. No one who can provide feedback and contribute to success is excluded from the process.

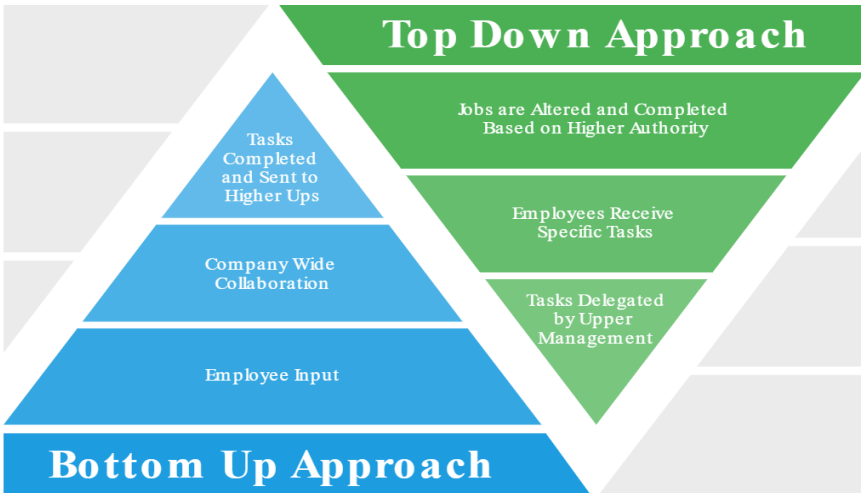


Figure 4.6 Top-down and bottom-up approaches (image taken from https://www.smartsheet.com/top-down-bottom-up-approach) (consulted on 25 June 2024)

The bottom-up approach emerged as a management strategy with the growing emphasis on Industrial and Organisational Psychology (I/O). I/O is defined by the American Psychological Association (APA) as the scientific study of the behaviour of people in organisations and in the work environment. Inspired by the principles of I/O, employers were persuaded to prioritise the well-being and contributions of their employees, leading to a shift away from top-down decision making. The Hawthorne Experiments, conducted as early as 1924, demonstrated that improved workplace conditions led to increased productivity. This supports the notion that employees perform better when they feel valued. Elton Mayo was a proponent of I/O and the bottom-up approach. He contributed to the mid-20th-century human relations movement by advocating for improved social dynamics in the workplace. This shift ultimately gave rise to dedicated human resources (HR) departments focused on fostering employee engagement and organisational investment.

Table 4.2 summarizes the main concepts linked to the different approaches as described by Munnecke and Lugt (2006):

	BOTTOM-UP	TOP-DOWN
LEVEL OF ANALYSIS	Micro-level	Macro-level
FACTORS	User-context, lifestyle, behaviour, values and enabling technologies.	Political, environmental, social, technological, economic and demographical.
TYPE OF KNOWLEDGE	Tacit and emerging	Eksplicit and Quantitative
ANALYSIS	Context-based	Trend-based
TYPE OF INNOVATION	Radical	Incremental
ORIENTATION	Solution- and action-oriented	Decision- and policy-oriented
MAIN ACTORS	Front-line workers	Top managers

Table 4.4 Top-down vs bottom-up approach (image taken from Munnecke and Lugt, 2006, p. 5)

4.11.2 Bottom-up approach in TS

Drugan (2014) applied the concepts of top-down and bottom-up approaches in the field of translation studies to a study about the integration of standards and tools in translation quality assessment. According to her findings,

> "[t]op-down approaches are hierarchical, driven from the top. They harness translation expertise and aim to manage or control quality levels. Associations with this group of approaches are traditional, conservative, authoritarian, or paternalistic. Bottom-up approaches, in contrast, are led by users or suppliers themselves. They draw on target-language ability and/or product expertise, combined with end-user feedback loops, rather than translation competence. Associations with this group of approaches are novel, radical, egalitarian, or democratic" (Drugan, 2014, p. 3).

The study discusses the pros and cons of two approaches to translation quality management and their impact on translation quality. Even though neither of them seems completely preferable, it notes that the top-down approach enforces good practice through training, customization, and support, resulting in increased customer confidence. On the other hand, the bottom-up approach is more flexible and adaptable to changing translation contexts, relying on the creativity of translators to exploit new technological features in different ways based on their field experience.

As already mentioned in Section 2.4.1, other researchers have proposed the use of a bottom-up approach to solve various problems in translation practice. In a workplace study, Ehrensberger-Dow (2014) reported that a translator's autonomy is crucial in adapting translation technologies to their working procedures. This is because it can be challenging for translators to find new and effective solutions to translation problems if they are limited by existing solutions. Sakamoto and Yamada (2020) suggested that a bottom-up approach could be useful to establish new best practices to define PE guidelines for all the stakeholders exploiting experience and skills of individuals (more details in Chapter 7).

4.11.3 Bottom-up approach and qualitative data coding (bottom-up^{COD})

Qualitative coding is the method of categorising extracts from qualitative data in a systematic way in order to find themes and patterns and achieve a deeper insight into the data. It is generally used with unstructured or semi-structured data collected through interviews or focus groups to organise it into themes and patterns to perform qualitative coding. Qualitative data coding enables researchers to conduct a systematic and rigorous analysis, providing transparency and reflexivity to the process. This helps to discover insights that accurately represent the data and the human stories they contain (Saldaña, 2009).

Qualitative coding may rely on deductive coding, inductive coding or a combination of the two. Deductive coding is a top-down approach that involves starting with a set of predefined codes and then finding excerpts that correspond to those codes. Inductive coding is a bottom-up or data-driven

approach that involves generating codes while analysing the data set, letting the story or theory emerge from the raw data itself. This is typical of TA, the method applied in the present study, as described in Section 4.8.1. Braun and Clarke (2006) differentiate between two types of TA: top-down or theoretical, which is driven by particular research questions and/or the focus of the researcher; and bottom-up or inductive, which is driven more by the data itself.

In the present research the data was collected specifically to investigate themes related to the RQs, the questionnaires were designed based on some theories and models as described in Section 4.8, and the interviews were coded using an inductive approach. In fact, the interview questions were designed to go deeper into the themes presented through the questionnaires and to give the participants the opportunity to express their personal opinions in order to allow for unforeseen themes or issues to emerge as the fieldwork progressed. The inductive analysis was utilised as a method of coding the interview data during the initial coding round, without the need to align them with the codes that were generated during the deductive phase of the questionnaire analysis. Instead, it was only at the conclusion of the inductive coding that the interview data was mapped to the pre-existing codes. The deductive coding was useful to track the theoretical and epistemological assumptions, and the inductive coding helped me to obtain a detailed analysis of some aspects of the data that were not included in the initial assumptions, enriching, and redefining the codes and themes to obtain an overall description of the data from a multifaceted perspective (Figure 4.7).

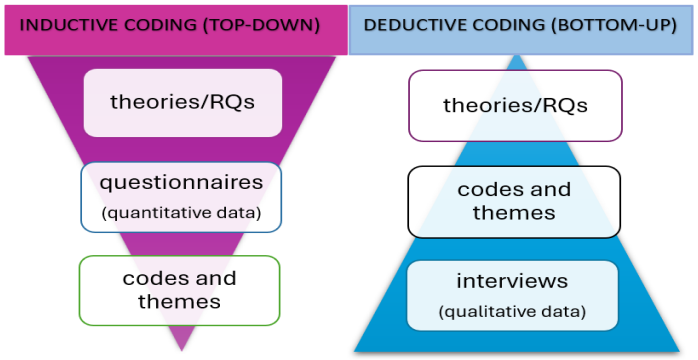


Figure 4.7 Bottom-up approach to coding in the present study

4.12 Concluding remarks

In the present chapter, the rationale for adopting the MMR and multiphase design approach is presented. Following the presentation of the MMR approach and the research worldview, Section 4.2.3 elucidates the rationale behind and the reasons for the combination of pragmatism and interpretivism in the present study. Section 4.3 (and the subsequent subsections) provides a comprehensive account of the conceptualisation and implementation of the multiphase design in the research process and delineate the advantages and challenges associated with the MMR approach. The subsequent sections are devoted to the presentation of the research setting, the participants, data collected, and the methods employed for its acquisition. A description of the procedure adopted

to protect and store the data collected is provided in Sections 4.9 and 4.9.1. The final sections are devoted to the methods employed for data analysis and the delineation of the bottom-up approach that was adopted for the introduction of translation technologies in the present study.

In the next chapter, I will present the results obtained from an ANT perspective and elucidate how the internal network of human and non-human actors in the Ministry of Justice evolved over the course of the fieldwork.

Chapter 5 Translation technologies and training

5. Introduction

The selection of software programs for this study was one of the most challenging and intricate aspects, as numerous factors had to be considered: budgetary constraints (i.e. only free licenses), the duration of the study, the number of participants, the legal and security requirements of the Ministry of Justice, potential future developments of the project, and, last but not least, usability and ergonomics: the human factor.

In recent years, the term "translation technologies" has gained increasing currency as a means of encompassing any software tool used to facilitate the conversion of content from one language to another. In accordance with the description provided on the European Commission's website: "We use **modern translation technologies** such as computer-assisted translation, translation memories, machine translation, terminology databases and other online resources".[4] The term is not limited to software that facilitates the creation and management of terminological databases (TMs and TBs) but also includes (N)MT engines, speech-to-text technologies and computer-aided interpreting (CAI), whether as desktop applications or as online/cloud resources. In the present study, not all of the aforementioned programmes are used. Two years after the beginning of the present study, the field also saw the emergence of Generative AI: in 2022 OpenAI released its first AI chatbot with generative pre-trained transformer technology (ChatGPT).

5.1 Advantages of CAT tools integrating MT

The primary objective was to pursue the human-led augmented translation approach, as proposed by Lommel (2017) and supported by Kenny (2018), as a prospective solution to facilitate and suggest the utilisation of NMT. In a recent study, O'Brien (2023) further developed this approach by examining the various definitions of "augmented" from a technical, societal, and ethical perspective. This was done based on the notion of "human-centred artificial intelligence" (HCAI). Given the considerable linguistic expertise and the minimal use of technology (primarily limited to Word and Google searches) by the translators at the Ministry of Justice (Section 4.6), there was a significant risk of participants withdrawing from the experiments due to difficulties in utilising translation technologies or misconceptions they might have about them. It was thus imperative to devise a learning process that would maintain their central role, allowing them sufficient time to gain expertise and confidence in utilising the tools without feeling overwhelmed or frustrated by something they could not fully control. Furthermore, the multiphase methodology employed for this study was deemed the most suitable for integrating the augmented translation approach into the workplace without disrupting the translators' regular daily activities and without placing an undue burden on them. This approach enabled me to gain familiarity with the working environment and its requirements, and to adapt any intervention, if necessary, in accordance with the feedback provided by the participants (Litwin, 2011;

[4] https://europa.eu/translation/ (last access 25 June 2024)

Cadwell et al., 2018). As already noted by Moorkens (2017) too, the integration of MT into CAT tools dims boundaries between MT output and TM leverage.

It is also important to consider that the advent of NMT has prompted researchers to explore the potential of MT in the legal domain (Killman and Mellinger, 2022). This has led to a focus on the benefits offered by CAT tools that integrate NMT, particularly in light of the distinctive features of the documentation and linguistic nuances (e.g. lengthy and intricate sentences, varying translations of the same term contingent on context, disparate styles for the same content but in different document types) prevalent within the Ministry of Justice. The preliminary study carried out 2018 at UNINT (Mileto, 2019) with students of the PE laboratory demonstrated that the concurrent use of TMs and TBs, integrated in a CAT tool with MT, could assist junior translators in optimally leveraging the output of a generic SMT engine.

Moreover, in the present study, the elevated risk of translation or terminology errors, effectively concealed by the fluency of the NMT output, necessitated a more rigorous level of control during the translation process. This could be achieved through the concurrent utilisation of TM retrieval, glossary suggestions and MT output, given that the initial two resources did not produce any results. The progressive enrichment of TMs and the creation of TBs helped the participants to gain familiarity with the different tools and to mitigate the impact of NMT, which was introduced 11 months after the beginning of the training with Group A (Section 4.7). The step-by-step process of enriching TMs while pursuing the additional goal of reaching one million words (Section 5.4) in order to custom train the engine provided the participants with the opportunity to exercise their agency in the use of translation technologies and in the training of the engine. The flexibility afforded by the augmented translation approach enabled translators to utilise the full range of linguistic data at their disposal, lists of terms, collections of frequently used expressions, materials prepared for simultaneous or consecutive interpretation that could be converted in TMs and TBs, and more. Furthermore, it gave them the opportunity to: clean TMs in order to avoid duplicates and inconsistent segments; fine-tune the TBs created with the terminology collected over the years; add a new function week after week, according to the needs arising from the use of the tools; and learn to collaborate and share linguistic materials with other colleagues. This was a good practice that was lost due to the rotation of two or three translators in the same workstation. This was due to the combination of onsite and offsite work, the quick turnaround nature of daily activities and the division of translators into two different locations (Section 4.5).

Figure 5.1 illustrates the various methods through which augmented translation can retrieve linguistic data from disparate sources:

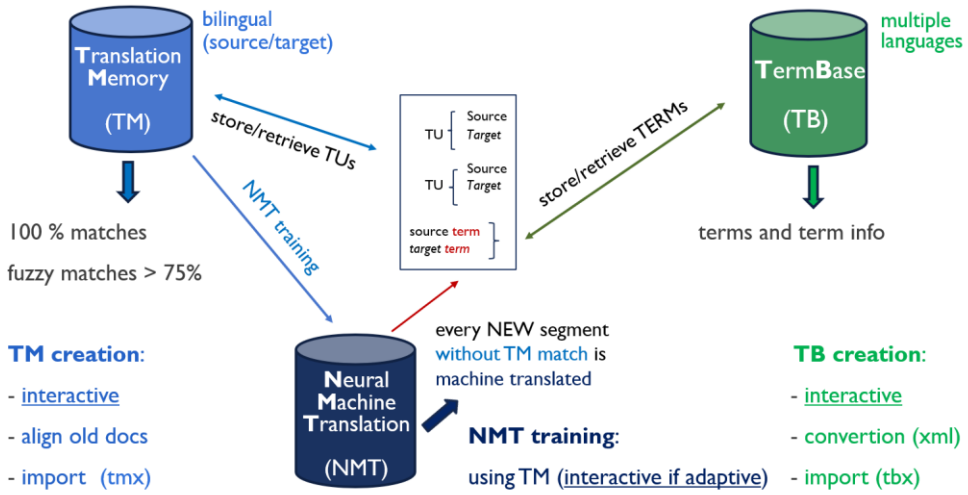


Figure 5.1 Augmented translation: linguistic data retrieval

Furthermore, there is an identified need for further investigation in the field of TS regarding the utilisation of augmented translation in real-life case studies in order to gain a deeper understanding of the subject matter.

In the following sections I will provide a more detailed description of the technical aspects of the present study related to the selection of tools, the training phase, the preparation of TMs for the NMT engine training and the preliminary results of the customised engine.

5.2 Technological requirements and selection of tools

In addition to identifying the optimal approach to utilising translation technologies in the aforementioned circumstances, a significant challenge was encountered which required considerable time and attention to resolve. This was the need to comply with the restrictions and requirements of the Ministry of Justice. A key element was the ability to work locally, without direct access to the Internet, due to the Ministry's firewalls, which tracked and blocked all incoming and outgoing data flows on the internal network. The need to use a tool that could be installed on the office's desktop PCs and on the laptops provided for remote working, and therefore provide the possibility of working on a dedicated server for database sharing. In order to ensure the protection of sensitive data, the documents should be anonymised before the translation tools were used, avoiding any cloud-based solution to carry out the operation. In addition, approximately 70-80 % of the documents to be translated were in PDF format, so it was necessary to convert them into a translatable format before anonymising and translating them. Finally, it was necessary to replace some PCs with outdated operating systems to deploy the new technologies.

It is noteworthy that the issues arising from the conversion of PDF format of the source files to be translated had a considerable impact on the deployment of translation tools, at times impeding their use. In the typical case, the PDF files were derived from a Word document that was printed or faxed (in some instances with a markedly low quality) to be signed and stamped for approval, and then

scanned. Consequently, the conversion of such PDFs into an editable format resulted in files with illegible characters and poor layout (Figure 5.2).

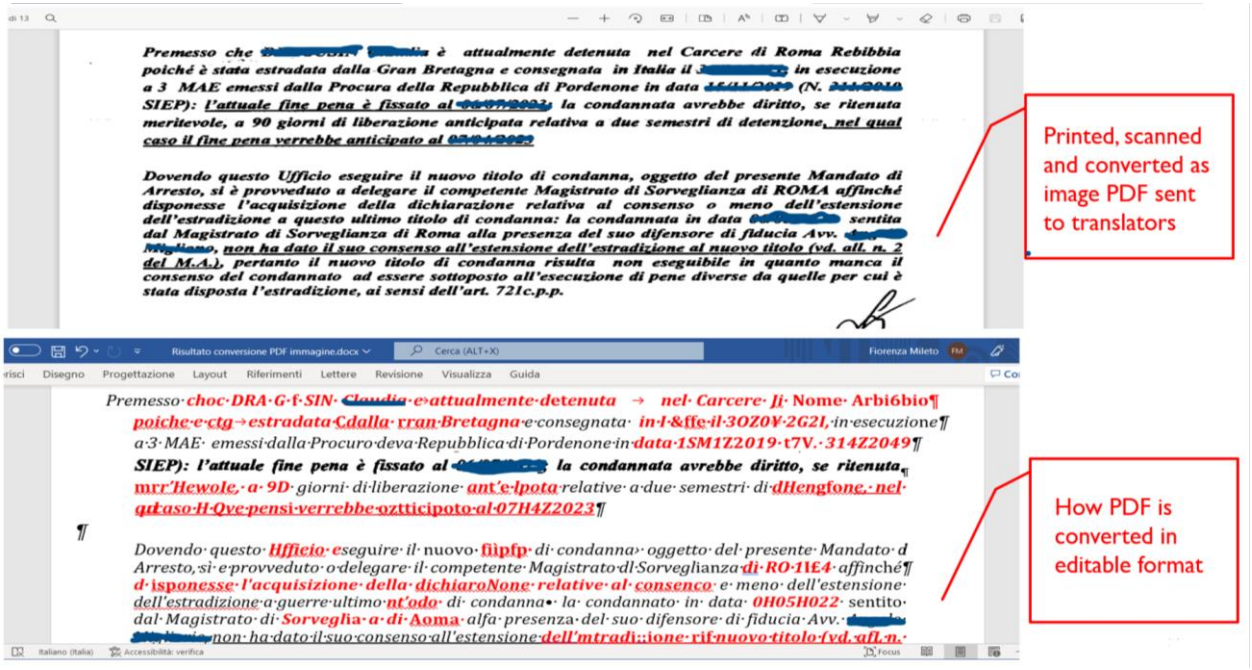


Figure 5.2 Example of the editable file resulting from PDF file conversion

Considering all these requirements, the learning process planned to guide translators towards a more intensive use of the technology, and the necessity of obtaining free licences for the duration of the fieldwork, it was essential to explore various options, taking into account the cost and scalability of different programmes, system requirements, flexibility, the ability to integrate with other programmes and with NMT engines, as well as functions to monitor quality improvement and to track the evolution of NMT engine over time.

In the end, the choice was narrowed down to programs with the most suitable features and those that offered university partnership programmes and free licences for academic purposes: Trados Studio 2021 (a very well-established CAT tool offering a complete suite of tools for translation, terminology management and workflow management); ModernMT (NMT engine characterized by its adaptive feature); and MTStudio (a program that allows to perform NMT engines training, comparison and evaluation in one environment). In addition to these tools, to solve the issue of anonymisation, I decided to use also the MAPA tool (Multilingual Anonymisation for Public Administrations), developed by an EU-funded project aimed at developing "a toolkit for the effective and reliable anonymisation of texts in the medical and legal fields". Two essential features of this anonymisation tool were: the possibility of local installation; and the possibility of pseudonymisation, because after a few tests, the results showed that anonymised segments were not useful for NMT training (especially for the issue of agreements of gender-marking endings).

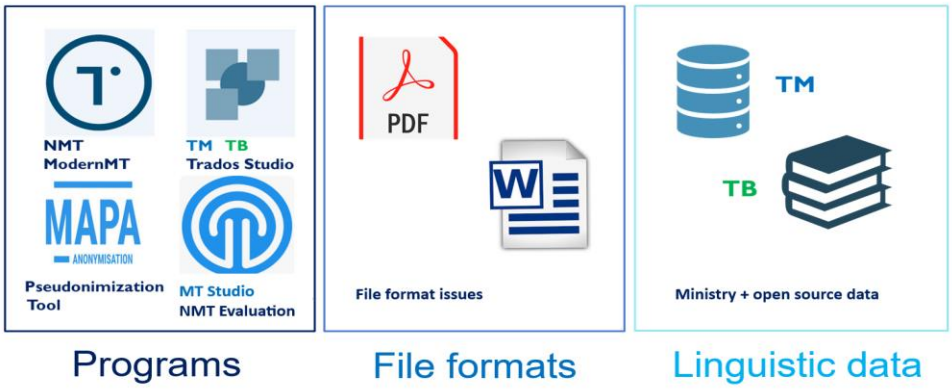


Figure 5.3 Tools employed for research projects

As far as Trados Studio 2021 is concerned, in addition to the improved OCR system (the best solution for opening and converting PDFs directly in the translation environment) and the alignment function integrated in the tool, the plug-ins offered free of charge via the AppStore site were a great support for research: integration of several NMT engines in the translation environment; functionality to perform research on a selection of websites in the work environment; direct connection to IATE; functionality to invert the language direction in TMs; conversion of Excel and .xml files into TBs; conversion of TMs into .sdlxliff files to clean and prepare TMs for NMT training using the tool's built-in quality checking and duplicate searching functions; and the post-edit version comparison plug-in to track changes made to NMT output segments.

The post-edit version comparison plug-in, in particular, proved to be an efficacious solution for the collection of data on the quality of the customised NMT engine, without imposing an undue burden on the translators. Ecological validity (Schofield, 2000; Mellinger and Hanson, 2022) was one of the most challenging aspects of the whole study because it was necessary to collect valid, accurate and objective data on the use of translation technologies with minimal impact on translators' daily activities. Furthermore, the study aimed at enabling participants to work autonomously, thus enhancing their empowerment in choosing the optimal approach for each task. The objective of selecting this Trados Studio was to afford translators the opportunity to undertake the principal activities necessary for the creation of TBs and the preparation of TMs for NMT training in a single environment. This was done with a view to reducing the effort required to learn how to use different translation technologies, and to compensate for the steep learning curve by striving to make them autonomous in as many activities as possible as soon as possible. This would allow participants to exercise their agency and decide on the optimal resources (e.g., combining TMs and NMT, or use only TMs) or features (e.g., perform terminology verification or filter TMs segments according to a specific subject) to use for each activity they had to perform.

5.2.1 Technological solution to evaluate the trained NMT engine

MT Studio is an additional tool that was introduced in a later phase, when the developer, Intento, launched its Academic Partner Program. It is designed to help customers evaluate and choose the best NMT engine for their needs, providing access to various vendors via a single API. Every year Intento releases an independent multi-domain evaluation of MT engines (Figure 5.4) that compares the performance of a selection of generic MT engines trained with publicly available datasets using automatic semantic similarity scores and plain text data.

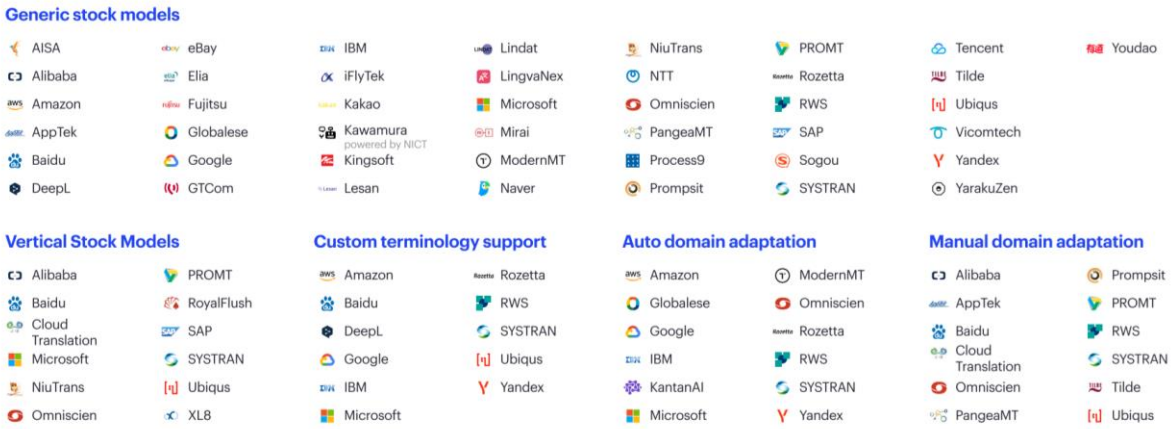


Figure 5.4 Machine translation landscape (Savenkov and Lopez, 2022)

In particular, the "State of Machine Translation 2022" report (Savenkov and Lopez, 2022) corroborated the results of the tests I performed with the assistance of linguists from the Ministry of Justice. These tests employed sample documents of translation previously performed by the linguists and free online engines, including eTranslation, DeepL, Reverso, Google, and ModernMT. The results supported my conclusion that ModernMT's adaptive engine was the most suitable for the legal domain in the language combination English – Italian (Figure 5.5). As evidenced in the report, DeepL also yielded encouraging outcomes, but I had to discard it because it was not possible to train the engine independently, and the company was not available to conduct a training session free of charge for academic purposes.

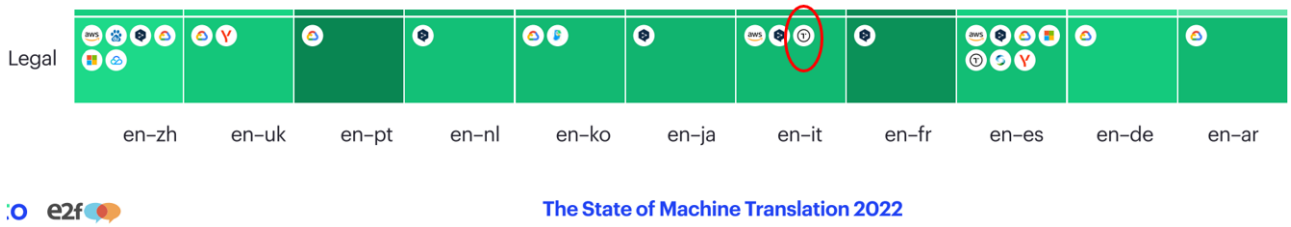


Figure 5.5 The best NMT engines in the legal sector (Savenkov and Lopez, 2022)

MT Studio offers the additional functionality of enabling users to prepare data for training custom models, in addition to its core capabilities of training and evaluating MT engines. All articles and materials developed for the training and evaluation of MT vendors, as well as for the cleaning and

preparation of linguistic data for the customisation of MT engines, are made available free of charge. The tool facilitated the collection of quantitative data on the various automatic scores applied to the customisation of ModernMT with the linguistic data from the Ministry of Justice. This allowed for a more in-depth analysis of the outcomes achieved following the initial training of the engine.

5.3 Designing training modules for translation tools

The preparation of the training programme was informed by my experience as a CAT trainer for two international companies that develop translation tools, and as a lecturer in translation technologies in master's degree programmes at university level. The objective was to develop a training plan that would be appropriate for the advanced linguistic proficiency of Ministry translators, who were nevertheless relatively inexperienced in the use of IT technologies (Section 4.7). I drew upon the training protocols I had previously employed in onsite professional training programmes for companies and organisations, as well as the programmes I had devised for students at the university level[5] (Mileto and Muzii, 2010).

Given the lack of in-depth information regarding both the number of hours per training session and the frequency of meetings at the time I had to submit the project proposal, I devised a series of three-hour modules to accommodate potential shifts in the scheduling of meetings. This approach allowed for a degree of adaptability in the arrangement of training sessions, aligning with the varying workloads and requirements of participants (Table 5.1).

	Module (3 hours)	**Objectives**	**Activities to be performed**
1	Introduction	• Share Ministry/translators' needs • Analysis of existing workflow • Volume/time analysis • Analysis of materials to be translated	Collection of materials to create translation memories and glossaries. (Preliminary questionnaire)[6]
2	Anonymisation	• Installation of the anonymisation tool, definition of guidelines for the anonymisation procedure (carried out by the Ministry) and training in the use of the programme	Anonymisation of materials to be used for the project (automated procedure with subsequent human verification)
3	Working environment setting	• Installation of tools • Start of training on CAT tools	Selection and preparation of formats to be used
4	Training	• Translation editor	Preparing translation memories
5	Training	• Translation memory management • Alignment of old translated files	Preparing glossaries
6	Training	• Terminology management • Conversion of existing glossaries, terminology extraction and creation of new glossaries	Defining quality criteria
7	Training	Functions for automatic terminology and quality check	Setting verification options
8	Training	Creation of translation quality evaluation form	

[5] https://unint.coursecatalogue.cineca.it/insegnamenti/2022/1607/2018/9999/10025?annoOrdinamento=2018 (consulted on 04 October 2024)

[6] Section 4.8.1 and Section 6.1.

9	Training	Setting a new workflow to integrate the functions of the tools learned	Defining activities/roles to be done
10	Training	• MT and post-editing • Different types of machine translation engines	Checking the functioning of machine translation on Ministry text types (eTranslation / DeepL)
11	Training	• Recurring errors in machine translation • How to prepare a text for machine translation	Testing machine translation engines with translation memories and prepared glossaries
12	Training	• Managing outsourcing using translation technologies • Providing feedback to external translators • Updating translation memories and glossaries with documents of external translators who do not use the adopted programme	
13	End of training	How to solve the most common problems related to the use of the tools, where to find useful information and how to get assistance	(Interview)[7]
	Kick off of second phase of project	On-the-job experimentation of the acquired tools and prepared materials: autonomous work of the linguists and familiarisation with tools under the guidance of the researcher	Supporting daily work and data collection for doctoral thesis compilation. (Mid-term and final questionnaires and interviews)[8]

Table 5.1 Training modules

The plan was initially presented to the Head of Department and the Head of Office I (Figure 4.2), and subsequently to the participants, approximately two months prior to the commencement of the research project. This was done with the intention of eventually amending it in accordance with the requests of the participants, as well as to facilitate comprehension of the level of commitment that would be required during this initial phase of research and to enable the participants to plan their activities accordingly.

Ultimately, the inability to install the anonymisation tool resulted in a reduction of the number of modules to 12. This resulted in six training sessions of six hours each, spanning six weeks, with Group A (Section 4.6). However, it was necessary to adapt the initial plan, dedicating additional time to verify the limitations of the programs on participants' PCs, test the functionalities of the programs with their documents, verify the potential of NMT on the various linguistic combinations, and organise glossaries. Two technicians from the IT department took part in two training sessions. The objective was twofold: firstly, to ascertain which limitations of the firewalls could be bypassed or reduced, and secondly, to test the functionalities of the programs once installed on the desktop PCs of the Ministry.

Terminology management and alignment of translated files (that is segmenting source and target files in order to create bilingual translation units to be imported in TMs) represented two central topics

[7] Section 4.8.2 and Section 6.2.2.
[8] Section 4.8.2, Section 7.3 and Section 7.4.

during the training. Firstly, the lists of terms and expressions created by the translators in Word over the years were not in the format required for glossary creation, as they were more akin to lists created for interpreting services (they were occasionally required also to provide internal interpreting services). However, the option of the CAT that allowed translators to insert terms in TBs on the fly during translation allowed them to partially compensate for this issue. Secondly, the majority of translated documents were not in a file format that could be read correctly by the programs, and in many cases, the alignment required a time-consuming pre-editing activity to prepare the files.

I was able to devote only a limited amount of time to quality evaluation, management of outsourced translation, and providing feedback to external translators. As a result of the experience gained with the Group A, the training sessions were reduced to four meetings of six hours each with Group B. This was mainly due not only to all the technical verifications that we had already performed, but also to the fact that the entire procedure dedicated to the management of outsourced work required a completely different approval process within the Ministry, which could not be implemented in the remaining months of the project.

Interestingly, the training phase represented also the first opportunity the participants had to work as a group. The participants were not accustomed to collaborative work, and during the initial two meetings, I observed indications of discomfort. However, the opportunity to share ideas, suggestions and solutions proved instrumental in establishing the foundations for the development of a strong team spirit, which was identified in questionnaires and interviews as one of the key factors in achieving significant outcomes and the continued progression of the project. Moreover, the necessity for IT experts to provide assistance to participants in a few training sessions proved to be a crucial factor in fostering their personal involvement in the project.

5.4 Involvement of trainee students and data preparation

During the training, the participants and I collaborated to select previously translated documents that would serve as an optimal repository of data for the enrichment of the TMs and the subsequent training phase of the NMT engine. Furthermore, the participants devised a plan for the alignment work to be conducted on these documents, distributing the workload among themselves. The objective was to create TMs comprising a minimum of one million words, which is the recommended starting point for initial training of a NMT engine as set out by the main software developers. Unfortunately, however, the file formatting issue significantly impeded the progress of this ancillary task, and after a couple of months, it became evident that the objective could not be met. I therefore proposed that five students from my own university should be given the opportunity to undertake an internship at the Ministry, with a view to collaborating on the preparation of the language data.

Given the impossibility of utilising the anonymisation tool, it was agreed with the participants that the segments containing sensitive data would not be saved in the TMs. This was done in order to train the NMT engine without any risk of data breach. However, it was not feasible to have the trainees

align documents containing sensitive data. Therefore, I proposed to have them align the open-source documents typically employed by participants as reference material. Consequently, I dedicated two sessions to the explanation of the data cleaning process to the trainees. This was done in order to prepare the TMs generated through the alignment task for the training of the NMT engine (Khayrallah and Koehn, 2018; Bane and Zaretskaya, 2021). Despite the availability of a variety of tools for the cleaning of TMs, including OpenRefine, and tools designed for TM editing such as Okapi Olifant, Goldpan, and Xbench (a desktop tool primarily utilized for quality assessment), the limited time frame did not allow for adequate familiarisation with these tools by the participants and the trainees. Accordingly, I decided to employ the verification functionalities of Trados Studio and the TM management plug-ins.

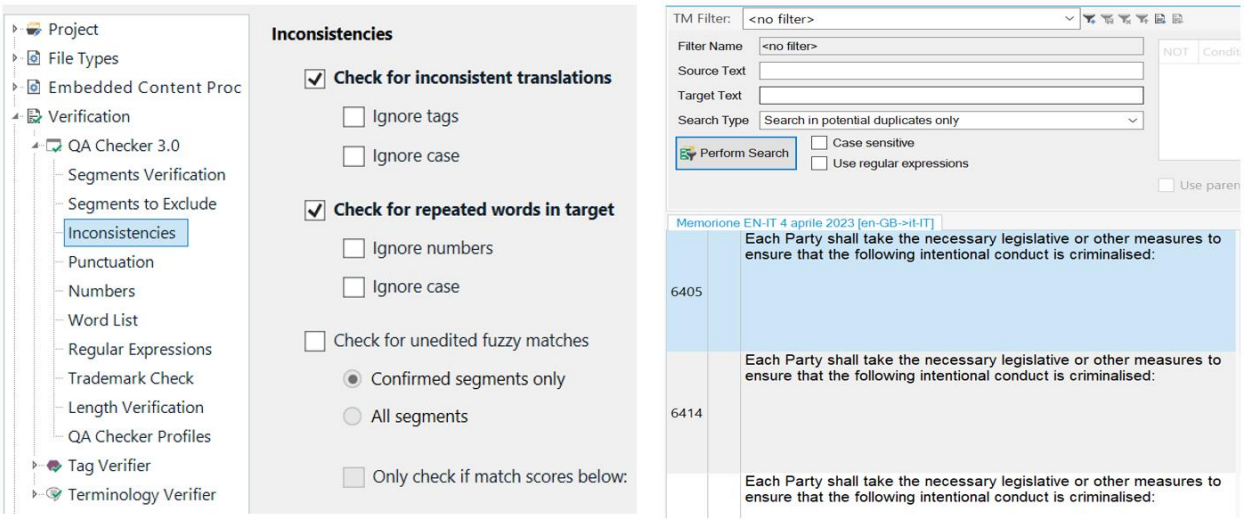


Figure 5.6 Trados Studio verification options and TM management functions

Starting from the data cleaning guidelines established by leading companies in the field (such as TAUS, RWS, Intento and Defined.ai), I devised a list of checks to be performed on TMs using the available options in the CAT (Figure 5.6):

- Imprecise translations which do not contain all of the details in the original sentence
- Misaligned segments
- Empty segments
- Text in the wrong language
- Spacing, corrupted characters, line breaks
- Duplicated or multiple translation for single segment
- Tags (encoding, HTML etc.)
- Case sensitivity
- Spelling errors

There was also the opportunity to use the automatic data cleaning option integrated in MTStudio without the necessity for human intervention (Figure 5.7). However, it was ascertained that, in addition to reducing the training dataset by approximately 400,000 words, this option did not resolve all the issues identified by the trainees. Figure 5.7 illustrates the outcome of an automated data cleaning process in MTStudio, where the software discarded 9,635 segments out of a total of 53,173 segments. Additionally, the cleaned dataset and the discarded segments can be downloaded (in .tmx or .csv formats) for a more detailed examination of the characteristics of the discarded segments, with the aim of identifying potential improvements and reusing them for another training session.

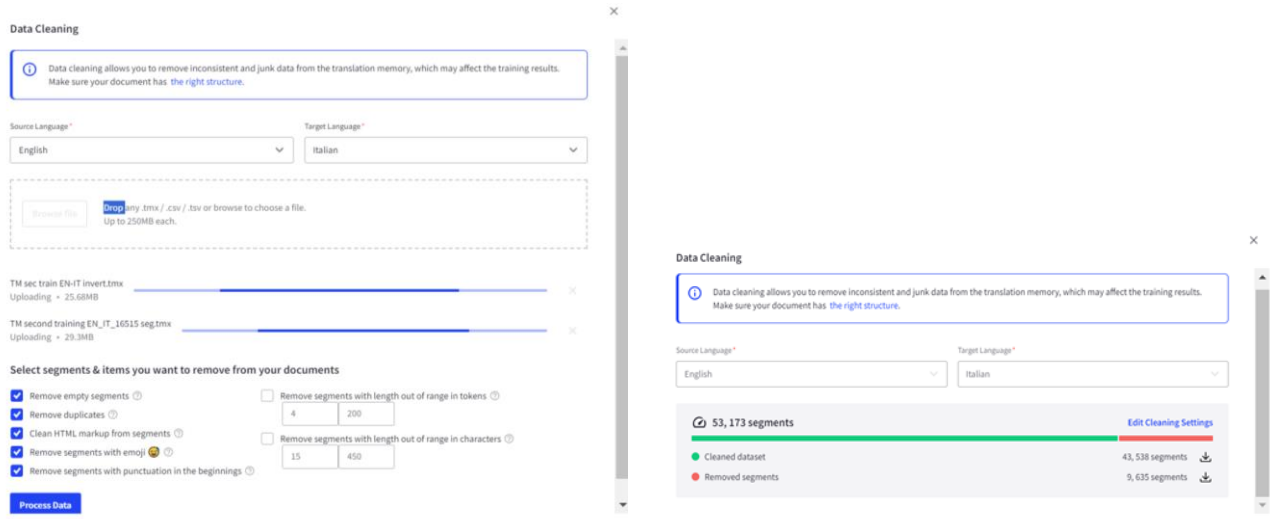


Figure 5.7 MTStudio function for data cleaning

The initial idea was to have participants clean their TMs and trainees care for the TMs they created with aligned documents. However, the unexpected onset of a significant workload prevented the participants from devoting the necessary time to this task, which was subsequently undertaken by the trainees.

Ultimately, after the preparation of approximately 1,200,000 words using Trados Studio, the cleaned words obtained to train the engine were approximately of 980,000 words (roughly 38,000 segments), comprising 40% of the participants' translations and 60% of open-source documents.

5.5 ModernMT engine customisation: training and evaluation procedure

The MTStudio software enables the user to undertake a comparative evaluation of one or more customised engines against a generic one. Alternatively, the user may undertake the training of a customised engine and subsequently evaluate its performance when tested against the same generic engine. The latter operation was conducted with ModernMT, resulting in the creation of two customised engines, one for English to Italian translation and the other for Italian to English (Figure 5.8).

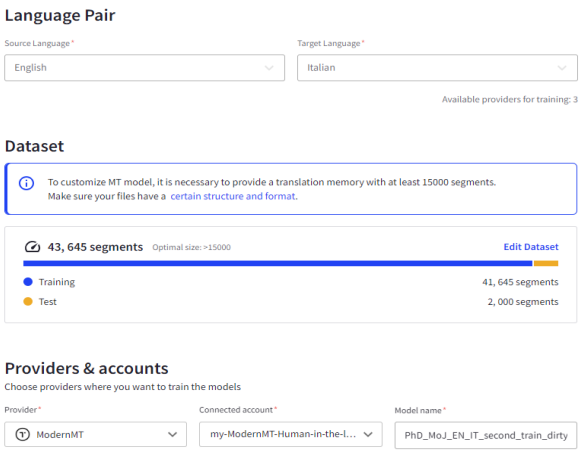


Figure 5.8 Setting a training project in MTStudio

The program automatically extracts a test set of 2,000 segments to provide the automatic scoring with six different evaluation metrics (Figure 5.9):

- *BERTScore*: aims to measure semantic similarity compared to a reference translation and ranges from 0 to 1. The greater the score, the closer a translation is to reference;
- *hLEPOR*: calculates the degree of similarity between n-grams in the MT and a reference translation of a text segment (taking into account length penalty, n-gram position difference penalty, and recall). It ranges from 0 to 1, the greater the score, the closer a translation is to the reference;
- *TER*: quantifies the number of edits necessary to align the MT output with the reference. The greater the score, the farther a translation is from reference;
- *BLEU*: gauges the precision of n-grams of the MT output in comparison to the reference text. The greater the score, the closer a translation is to reference;
- *chrF++*: calculates the degree of similarity between character n-grams in the MT and a reference translation. The greater the score, the closer a translation is to reference;
- *COMET*: predicts MT quality comparing the source input and the reference translation. The greater the score, the closer a translation is to the reference.

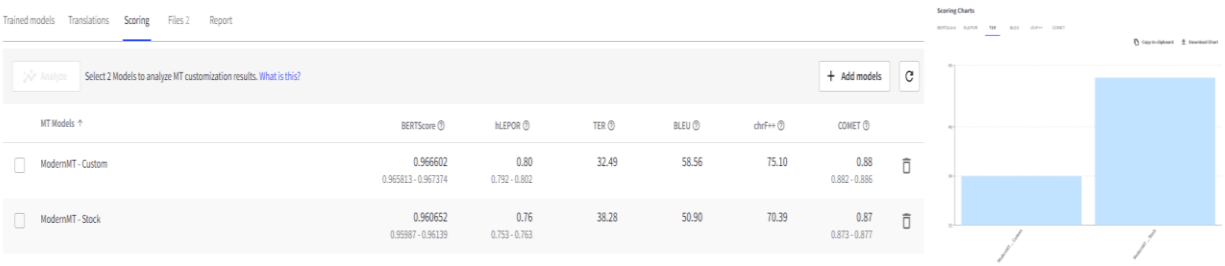


Figure 5.9 Automatic scoring in MTStudio

In order to facilitate a more informed evaluation, it is possible to download graphical representations of each score, as well as a list of “degraded” or “improved” segments from generic to custom, as will be explained later (Figure 5.10).

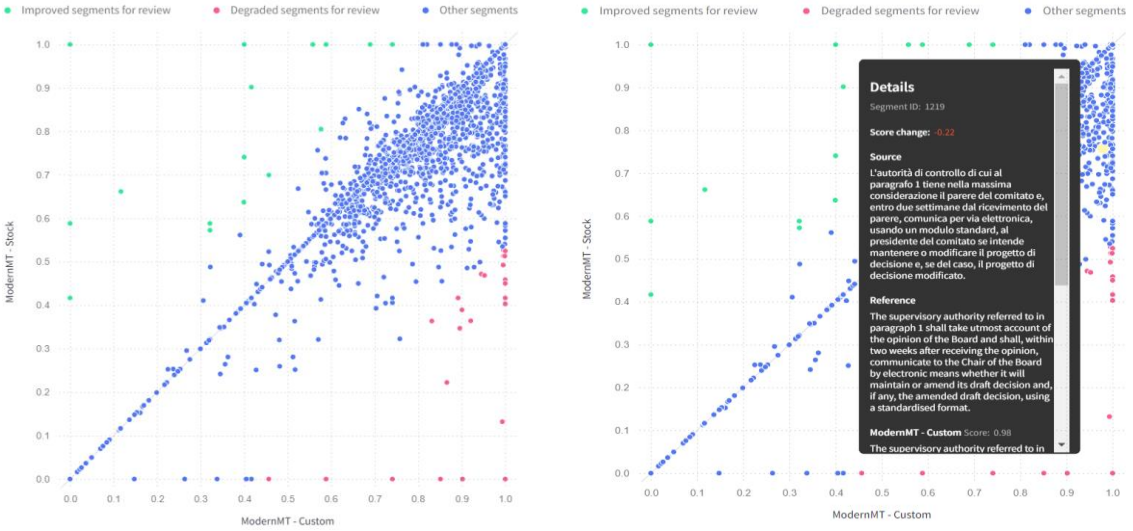


Figure 5.10 Graphical representation of degraded and improved segments

The scatter plot depicts the relationship between text segments and their proximity to the reference translation, with each point representing a distinct segment. If a point is situated above the diagonal, it can be inferred that the generic engine, ModernMT Stock, is more closely aligned with the reference than the custom engine, ModernMT Custom. Conversely, if a point is positioned below the diagonal, the opposite conclusion can be drawn. The green points represent the improved segments, indicating that ModernMT Stock is closer to the reference than ModernMT Custom. The red points represent the degraded segments, indicating that ModernMT Stock is significantly farther from the reference than ModernMT Custom. By hovering the cursor over each individual point, it is possible to view the segment in detail or it is possible to access the list of degraded and improved segments, review them and insert comments (Figure 5.11).

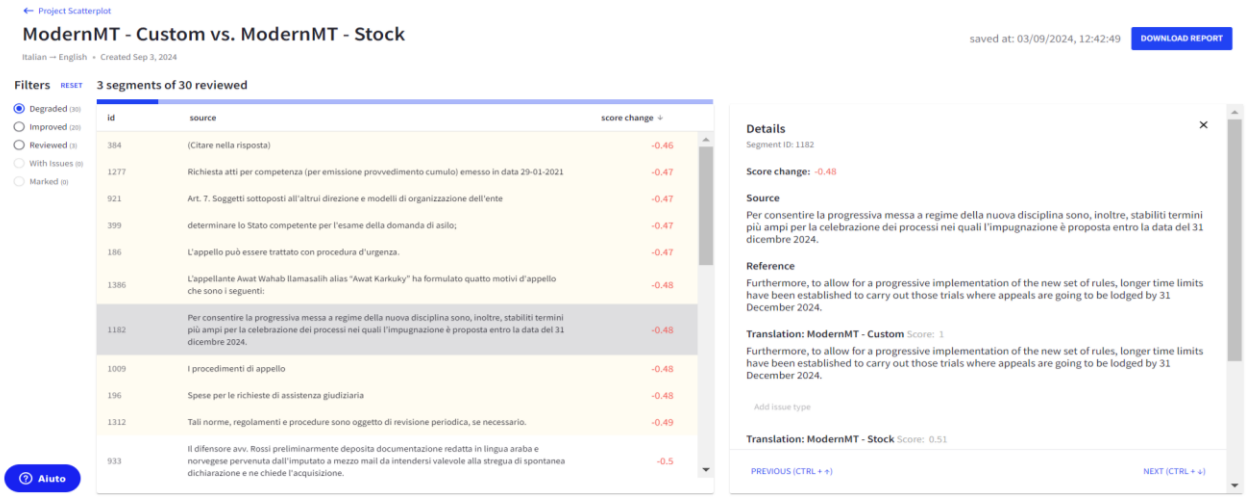
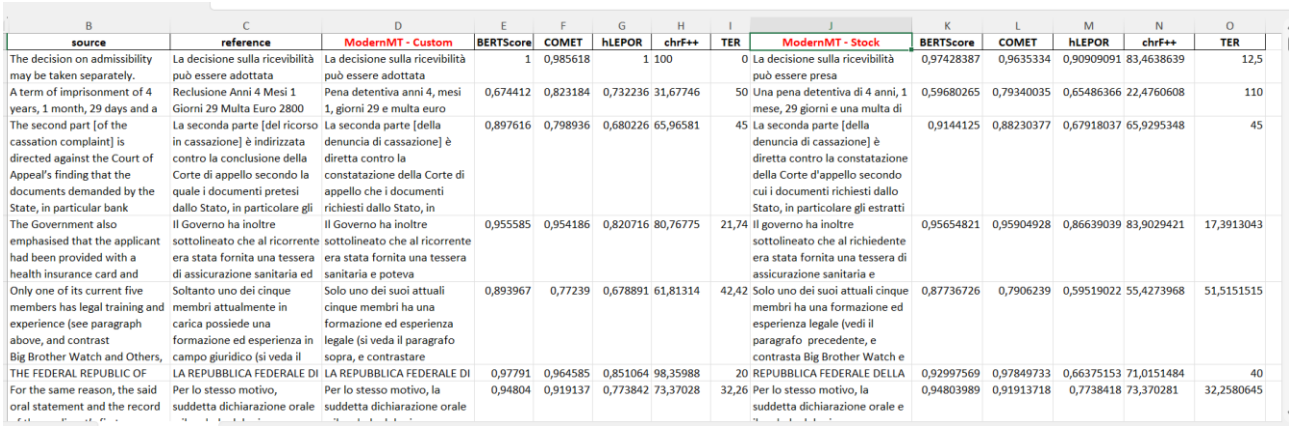


Figure 5.11 List of degraded segments

In addition to the corpus scoring, a spreadsheet is available for download, containing the 2,000 test segments translated with the corresponding scores for the custom and generic versions of the engine (Figure 5.12).



B	C	D	E	F	G	H	I	J	K	L	M	N	O
source	reference	ModernMT - Custom	BERTScore	COMET	hLEPOR	chrF++	TER	ModernMT - Stock	BERTScore	COMET	hLEPOR	chrF++	TER
The decision on admissibility may be taken separately.	La decisione sulla ricevibilità può essere adottata	La decisione sulla ricevibilità può essere adottata	1	0,985618	1	100	0	La decisione sulla ricevibilità può essere presa	0,97428387	0,9635334	0,90909091	83,4638639	12,5
A term of imprisonment of 4 years, 1 month, 29 days and a	Reclusione Anni 4 Mesi 1 Giorni 29 Multa Euro 2800	Pena detentiva anni 4, mesi 1, giorni 29 e multa euro	0,674412	0,823184	0,732236	31,67746	50	Una pena detentiva di 4 anni, 1 mese, 29 giorni e una multa di	0,59680265	0,79340035	0,65486366	22,4760608	110
The second part [of the cassation complaint] is directed against the Court of Appeal's finding that the documents demanded by the State, in particular bank	La seconda parte [del ricorso in cassazione] è indirizzata contro la conclusione della Corte di appello secondo la quale i documenti pretesi dallo Stato, in particolare gli	La seconda parte [della denuncia di cassazione] è diretta contro la constatazione della Corte di appello che i documenti richiesti dallo Stato, in	0,897616	0,798936	0,680226	65,96581	45	La seconda parte [della denuncia di cassazione] è diretta contro la constatazione della Corte d'appello secondo cui i documenti richiesti dallo Stato, in particolare gli estratti	0,9144125	0,88230377	0,67918037	65,9295348	45
The Government also emphasised that the applicant had been provided with a health insurance card and	Il Governo ha inoltre sottolineato che al ricorrente era stata fornita una tessera di assicurazione sanitaria ed	Il Governo ha inoltre sottolineato che al ricorrente era stata fornita una tessera sanitaria e poteva	0,955585	0,954186	0,820716	80,76775	21,74	Il governo ha inoltre sottolineato che al richiedente era stata fornita una tessera di assicurazione sanitaria e	0,95654821	0,95904928	0,86639039	83,9029421	17,3913043
Only one of its current five members has legal training and experience (see paragraph above, and contrast Big Brother Watch and Others,	Soltanto uno dei cinque membri attualmente in carica possiede una formazione ed esperienza in campo giuridico (si veda il	Solo uno dei suoi attuali cinque membri ha una formazione ed esperienza legale (si veda il paragrafo sopra, e contrastare	0,893967	0,77239	0,678891	61,81314	42,42	Solo uno dei suoi attuali cinque membri ha una formazione ed esperienza legale (vedi il paragrafo precedente, e contrasta Big Brother Watch e	0,87736726	0,7906239	0,59519022	55,4273968	51,5151515
THE FEDERAL REPUBLIC OF	LA REPUBBLICA FEDERALE DI	LA REPUBBLICA FEDERALE DI	0,97791	0,964585	0,851064	98,35988	20	REPUBBLICA FEDERALE DELLA	0,92997569	0,97849733	0,66375153	71,0151484	40
For the same reason, the said oral statement and the record	Per lo stesso motivo, suddetta dichiarazione orale	Per lo stesso motivo, la suddetta dichiarazione orale	0,94804	0,919137	0,773842	73,37028	32,26	Per lo stesso motivo, la suddetta dichiarazione orale e	0,94803989	0,91913718	0,7738418	73,370281	32,2580645

Figure 5.12 Spreadsheet with segment level scoring

These functionalities were employed for the initial linguistic assessment of the quality of the trained NMT engine, the identification of the primary issues inherent in the NMT output, and the utilisation of the other functions inherent to the translation tools for the compensation of such issues. This was achieved, for instance, through the deployment of the terminology verification option for the reduction of terminology errors or the segment fragment option for the automatic retrieval of translation chunks from TMs.

5.5.1 First evaluation of customised engine

The TER score was selected as a reference metric for two reasons. Firstly, it was the metric integrated in the post-edit compare plug-in of Trados Studio. Secondly, the IT experts and three participants were already familiar with it. The preliminary assessment conducted with the assistance of the participants aimed to identify the segments with the highest and lowest quality ratings according to the TER score. After the training, the TER score at corpus level was reduced by about six points for both the English - Italian and the Italian - English combinations.

The objective was to identify a pattern, whether it be the most frequent errors or the sentences which presented greater difficulty for the engine in comprehending them. A straightforward four-item framework was devised to identify errors, comprising the following criteria: mistranslation (incorrect meaning: red), terminology (inappropriate term: blue), accuracy (grammar, spelling, word order, missing or added words: green), and style (sentence structure and register: yellow) (Table 5.2). This would allow us to determine which type of text would be better to translate as initial experience of post-editing process for participants. We found a lot of terminology issues and mistranslations:

N.	Source sentence	Reference sentence	ModernMT output	Error category
1	Total main sentence:	Pena principale complessiva:	Totale frase principale:	Terminology

2	With respect to incoming letters of request, the relevant execution procedure shall be regulated by Articles 723 – 726-sexies of the Code of Criminal Procedure in the absence of a treaty.	Con riguardo alle rogatorie passive, la procedura di esecuzione, in assenza di trattati, è disciplinata dagli artt. 723 – 726-sexies c.p.p.	Per quanto riguarda le lettere di richiesta in entrata, la relativa procedura di esecuzione è disciplinata dagli articoli 723 – 726-sexies del codice di procedura penale in assenza di un trattato.	Terminology (in the remaining part of the sentence, to word order is different, but the translation is correct)
3	MEASURES AFFECTING PROPERTIES	MISURE REALI	MISURE CHE INCIDONO SULLE PROPRIETÀ	Terminology
4	Availability of procedures under national law	Procedure disponibili secondo la legislazione nazionale	Disponibilità di procedure a norma del diritto nazionale	Mistranslation
5	The basis for Mr. Bianchi contesting his extraction is that he will argue:	A fondamento della tesi con la quale il Sig. Bianchi si oppone all'estradizione egli adduce le seguenti argomentazioni:	La base per il signor Bianchi contestare la sua estrazione è che egli sosterrà:	Mistranslation (it does not have any meaning in Italian)
6	However proceedings to detect misconduct may be instituted separately in the form of objections, as generally contemplated for joint and several obligations in compliance with the rights of defence granted to the direct wrongdoer.	I giudizi di accertamento della violazione, nella forma di ricorso in opposizione, possono tuttavia instaurarsi disgiuntamente, come generalmente previsto per le obbligazioni solidali, nel rispetto delle garanzie di difesa accordate al diretto responsabile.	Tuttavia, i procedimenti per individuare un comportamento scorretto possono essere avviati separatamente sotto forma di obiezioni, come generalmente previsto per gli obblighi congiunti e multipli in conformità con i diritti di difesa concessi al trasgressore diretto.	Terminology (very technical terms)
7	The competent authorities should abstain from presenting suspects or accused persons as being guilty, in court or in public, through the use of measures of physical restraint, such as handcuffs, glass boxes, cages and leg irons (…).".	Le autorità competenti dovrebbero astenersi dal presentare gli indagati o imputati come colpevoli, in tribunale o in pubblico, attraverso il ricorso a misure di coercizione fisica, quali manette, gabbie di vetro o di altro tipo e ferri alle gambe (…).".	Le autorità competenti dovrebbero astenersi dal presentare gli indagati o imputati come colpevoli, in tribunale o in pubblico, attraverso l'uso di misure di contenzione fisica, come manette, scatole di vetro, gabbie e ferri da stiro (...).".	Mistranslation
8	Unless the law states differently, an entity is not prosecuted if an amnesty has been granted for a	Salvo che la legge disponga diversamente, non si procede nei confronti dell'ente quando è concessa amnistia per un	A meno che la legge non disponga diversamente, un'entità non è perseguita se è stata concessa	terminology (there were also other occurencies

	crime for which it is held liable and the offender has declined the application of the amnesty.	reato in relazione al quale è prevista la sua responsabilità e l'imputato ha rinunciato alla sua applicazione.	un'amnistia per un reato per il quale è ritenuta responsabile e il trasgressore ha rifiutato l'applicazione dell'amnistia.	translated as "autore del reato")

Table 5.2 Evaluation test segments

Notwithstanding the low score of some segments, we found out that in some cases it was only a matter of word order that did not compromise the meaning nor was the output wrong from a stylistic point of view. Apart from very technical terminology (Q6) and one completely incorrect translation (Q7), the translations proposed for the term "offender" (Q8) have three different translations in Italian, depending on the context. This is a very common issue in legal translation.

Interestingly, in some cases the training was particularly effective, and some segments had a zero TER score, that is they were translated exactly as the reference translation (red text represents relevant terminology improvement in Table 5.3).

Source	**Reference**	**ModernMT – Custom**	**ModernMT - Custom_TER**	**ModernMT – Stock**	**ModernMT - Stock_TER**
EUR 6.000 (euro seimila), oltre l'importo eventualmente dovuto a titolo di imposta, per il danno non patrimoniale;	EUR 6,000 (six thousand euros), plus any tax that may be chargeable, in respect of non-pecuniary damage;	EUR 6,000 (six thousand euros), plus any tax that may be chargeable, in respect of non-pecuniary damage;	0	EUR 6,000 (six thousand euros), in addition to the amount possibly due as tax, for non-pecuniary damage;	58,82352941
ne dà notifica per iscritto all'altra parte; e	notify the other Party in writing; and	notify the other Party in writing; and	0	give written notice to the other party; and	85,71428571
qualora, dopo essere stata trasferita, la persona condannata abbia espressamente rinunciato a beneficiare della regola della specialità riguardo a specifici reati anteriori al suo trasferimento.	when the sentenced person, after his or her transfer, has expressly renounced entitlement to the specialty rule with regard to specific offences preceding his or her transfer.	when the sentenced person, after his or her transfer, has expressly renounced entitlement to the specialty rule with regard to specific offences preceding his or her transfer.	0	if, after being transferred, the sentenced person has expressly waived the benefit of the specialty rule in respect of specific offences prior to his transfer.	66,66666667

Ufficio responsabile dell'accertamento del credito:	Office responsible for the assessment of the claim:	Office responsible for the assessment of the claim:	0	Office responsible for credit assessment:	62,5
To send a copy of the decision to the prosecutor of Shengavit Administrative District.	Trasmettere copia della decisione al Procuratore del Distretto Amministrativo di Shengavit.	Trasmettere copia della decisione al Procuratore del Distretto Amministrativo di Shengavit.	0	Inviare una copia della decisione al pubblico ministero del distretto amministrativo di Shengavit.	36,36363636
Signature of the issuing authority and/or its representative certifying the content of the Confiscation Request Form as accurate and correct:	Firma dell'autorità di emissione e/o del suo rappresentante che certifica l'esattezza e la correttezza delle informazioni contenute nel modulo di richiesta di confisca:	Firma dell'autorità di emissione e/o del suo rappresentante che certifica l'esattezza e la correttezza delle informazioni contenute nel modulo di richiesta di confisca:	0	Firma dell'autorità emittente e/o del suo rappresentante attestante che il contenuto del modulo di richiesta di confisca è accurato e corretto:	60,86956522

Table 5.3 Segments with zero TER after training

As shown in Table 5.3, in some cases not only the terminology but also the style was improved (highlighted segments). In some cases, the TER score did not change at all, and in others the generic engine actually outperformed the trained one.

The participants who decided to test the integration of the customised NMT engine in the CAT environment provided me with some of the translations they performed, and I used the Post-edit Compare plug-in in Trados Studio to evaluate them. This tool reports on translation changes during the post-editing phases by comparing two versions of the same SDLXLIFF file (before and after changes have been applied). It generates a comparison report with a breakdown of modifications (Figure 5.13) and all linguistic changes in the file, highlighted with track changes functionality (Figure 5.14).

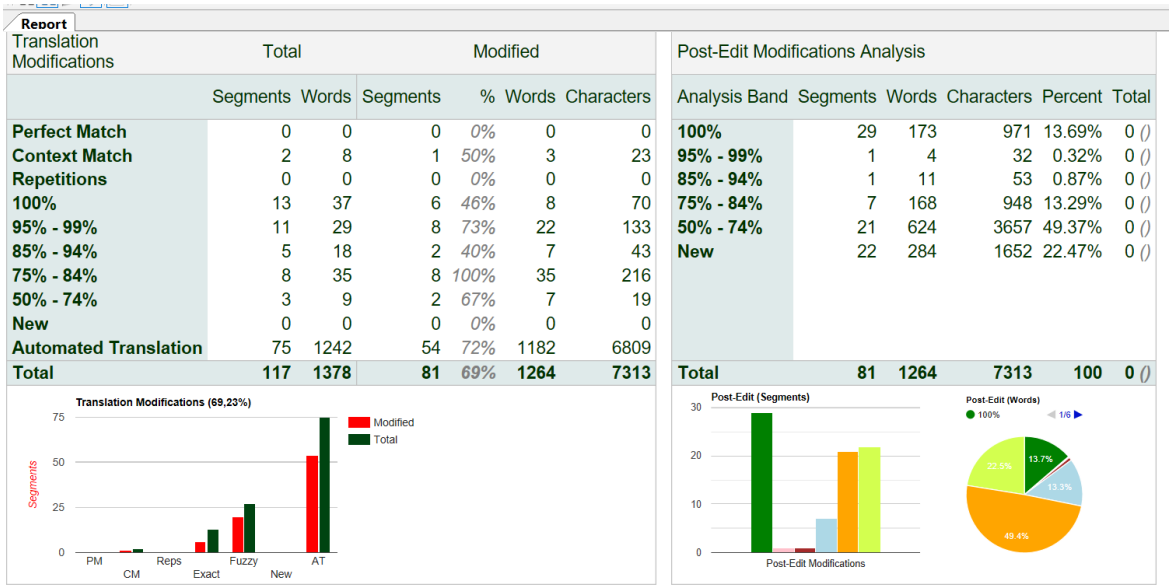


Figure 5.13 Post-edit Compare modifications report

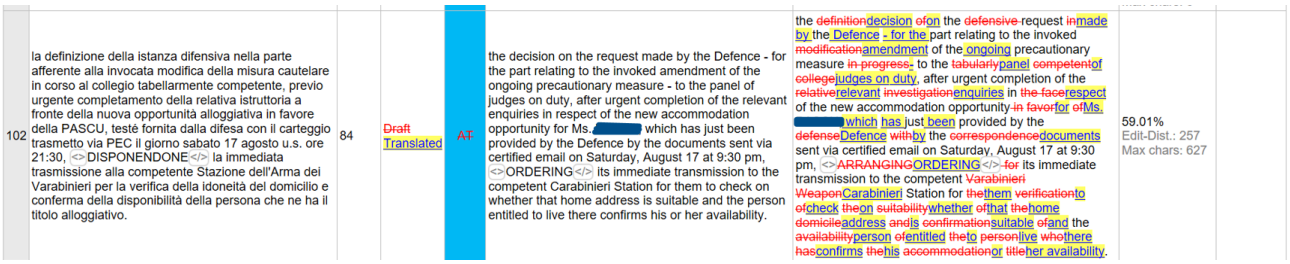


Figure 5.14 Post-edit Compare track changes report

The file formatting issue precluded the optimal utilisation of the TERp metric integrated in this plug-in due to the incorrect management of tags generated during the conversion of PDF files which distorted all the results. Nevertheless, the data collected regarding the post-editing phase with track changes and the outcomes of the trained engine in interaction with TMs and TBs proved to be beneficial.

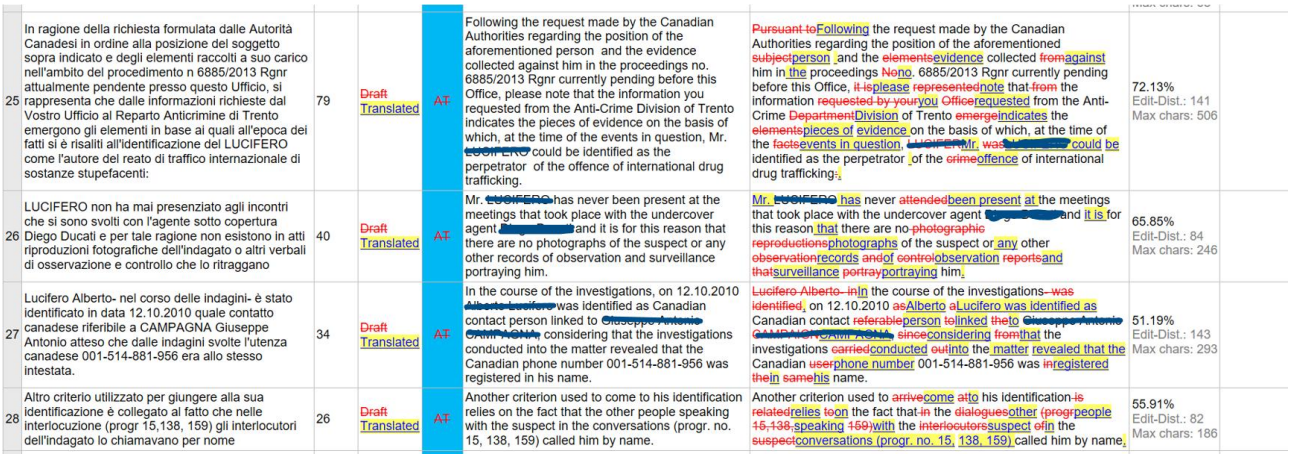


Figure 5.15 Post-edited document sample

The results varied from documents that required many changes as shown in Figure 5.15, to segments in which the NMT output required no changes at all (Table 5.4).

Italian source / input	**English target / (raw) output**
La Corte ritiene necessario acquisire le seguenti informazioni/documenti:	The Court deems it necessary to obtain the following information/documents:
l'ordinanza di carcerazione preventiva tradotta in italiano;	pre-trial custody in prison order with a translation into Italian;
le ragioni del tempo trascorso tra il fatto-reato e la richiesta di carcerazione preventiva;	the reasons for the length of time that has elapsed between the crime and the request for pre-trial custody in prison;
la sussistenza di condizioni di pericolo per l'incolumità dell'interessato in caso di consegna e le misure di tutela in caso di pericolo;	whether there is a risk of danger for the safety of the person concerned in the event of surrender and any protection measures in place in case of danger;
precedenti penali e attuali pendenze a carico del richiesto in consegna.	prior convictions and pending criminal proceedings against the person to be surrendered.

Table 5.4 Unchanged NMT output

Moreover, the adaptive feature demonstrated considerable utility even in the context of prepositions, a well-documented challenge for NMT, particularly in the case of languages like Italian. In certain instances, the engine was able to learn from the post-edited sentence:

Source	**First output**	**Second output**
In riferimento alla procedura a carico della nominata in oggetto, si trasmette...	Regarding the procedure to be carried out by the person referred to above...	Regarding the procedure to be carried out against the person referred to above...

Table 5.5 Example of the adaptive feature

In the first output the engine introduced a serious translation mistake that was corrected in the second output. There are still issues with proper nouns, even if they were all capitalised: the name INQUIETO was translated the first time as RESTLESS and the second time as DISQUIET, while the name PASCU was translated as EASTER. The engine had also problems with very common name like “Stazione dell’Arma dei Carabinieri” that was translated into “Carabinieri Weapon Station”.

In particular, in the language combination Italian–English, a number of issues persist, not only with regard to the very long and convoluted sentences that are typical of the style known as "legalese," but also with regard to other errors that are sometimes observed in the resulting text:

Italian source	**NMT output**
…all’esecuzione provvede il procuratore…	…the prosecutor shall be executed…
…non si procede nei suoi confronti…	...there is no progress against him…
…pendenza del processo…	…slope of the process…

…riduzione delle pene…	…penis reduction…

Table 5.6 Examples of NMT output mistranslations

Notwithstanding the reported issue, one of the last Post-edit Compare analyses provided promising results in the post-editing of a document that required fewer amendments than expected, as shown in Table 5.7. The RED colour coding indicates the terminology errors, BLUE the preferential changes, while minor stylistic changes were HIGHLIGHTED:

Source	NMT	Post-edited
Consultation **regarding** consent to the forwarding of a judgment and a certificate to Italy pursuant to European Council Framework Decision 2008/909/JHA	Consultazione **in merito al** consenso alla trasmissione di una sentenza e di un certificato all'Italia ai sensi della decisione quadro 2008/909/GAI del Consiglio europeo	Consultazioni **sul** consenso alla trasmissione all'Italia della sentenza e del certificato ai sensi della **D**ecisione **Q**uadro del Consiglio dell'Unione Europea 2008/909/GAI
By a judgment passed by the High Court of Eastern Denmark on 20 March 2024, XXX, an afghan national born on 1 January 1990, was sentenced to imprisonment 1 year for violation of section 59 b(1) of the Danish Aliens Act (entering Denmark in contravention of a ban on re-entry).	Con sentenza emessa dall'Alta Corte della Danimarca orientale il 20 marzo 2024, XXX, cittadino afgano nato il 1° gennaio 1990, è stato condannato a 1 anno di reclusione per violazione della sezione 59b (1) della legge danese sugli stranieri (ingresso in Danimarca in violazione di un divieto di reingresso).	Con sentenza pronunciata dall'Alta Corte della Danimarca orientale il 20 marzo 2024, XXX, cittadino afgano, nato il 1° gennaio 1990, è stato condannato a 1 anno di reclusione per violazione dell'articolo 59b (1) della legge danese sugli stranieri (ingresso in Danimarca in violazione di un divieto di reingresso).
Furthermore, an expulsion order was made against XXX with an entry ban prohibiting entry into Denmark for 6 years.	Inoltre, è stato emesso un ordine di espulsione contro XXX con un divieto di ingresso che vieta l'ingresso in Danimarca per 6 anni.	Inoltre, nei confronti di XXX è stato emesso un ordine di espulsione contenente un divieto di ingresso che vieta l'ingresso in Danimarca per 6 anni.
The judgment is final and enforceable.	La sentenza è definitiva ed esecutiva.	La sentenza è definitiva ed esecutiva.
XXX holds an Italian residence permit.	XXX è titolare di un permesso di soggiorno italiano.	XXX è titolare di un permesso di soggiorno italiano.
He states that he has resided in Milan, Italy.	Dichiara di aver risieduto a Milano, Italia.	Dichiara di aver risieduto a Milano, Italia.
He has further stated that he speaks Italian and that he has completed an education in carpentry in Italy.	Ha inoltre dichiarato di parlare italiano e di aver completato una formazione in falegnameria in Italia.	Ha inoltre dichiarato di parlare italiano e di aver conseguito in Italia la formazione in falegnameria.
On 23 April 2024, XXX has declared that he wishes to be transferred to Italy.	Il 23 aprile 2024, XXX ha dichiarato di voler essere trasferito in Italia.	Il 23 aprile 2024, XXX ha dichiarato di voler essere trasferito in Italia.
Please find enclosed, XXX declaration regarding transfer to Italy and a copy of **his** Italian residence permit, Italian ID-card and Italian health card.	Si allega la dichiarazione di XXX relativa al trasferimento in Italia e una copia del **suo** permesso di soggiorno italiano, della carta d'identità italiana e della tessera sanitaria italiana.	Si allega la dichiarazione di XXX relativa al trasferimento in Italia e copia del permesso di soggiorno italiano, della carta d'identità italiana e della tessera sanitaria italiana.
Due to the abovementioned information, the department is satisfied that the enforcement of the sentence by the Italian authorities would serve the purpose of facilitating the social rehabilitation of XXX.	A causa delle suddette informazioni, il dipartimento è convinto che l'esecuzione della pena da parte delle autorità italiane abbia lo scopo di favorire il reinserimento sociale di XXX.	In base alle informazioni di cui sopra, il dipartimento ritiene che l'esecuzione della pena a cura delle autorità italiane avrebbe lo scopo di facilitare il reinserimento sociale di XXX.
Against this background, the Department of Prisons and Probation wishes to inquire if the Italian authorities will give its consent to the forwarding of the judgment and the certificate with a view to take over the enforcement of the sentence imposed on XXX.	In questo contesto, il Dipartimento delle carceri e della libertà vigilata desidera chiedere se le autorità italiane daranno il loro consenso alla trasmissione della sentenza e del certificato al fine di assumere l'esecuzione della pena inflitta a XXX.	Alla luce di queste circostanze, il Dipartimento carceri e sospensione condizionale prega di comunicare se le autorità italiane intendano prestare il proprio consenso alla trasmissione della sentenza e del certificato al fine di farsi carico dell'esecuzione della pena inflitta a XXX.

Table 5.7 Post-edited document with few changes

5.6 Concluding remarks

A collateral aspect related to the replicability of this research project was also an opportunity to provide a possible solution to one of the main issues related to the use of translation technologies, namely, the question of how to introduce translation technologies in a complex work environment.

In 2022, Phrase conducted a survey in collaboration with Nimdzi to investigate the challenges encountered by companies when deciding to implement MT. Nimdzi conducted three discrete studies, analysing a survey of 250+ LSPs and two additional surveys intended for buyers of language services (approximately 100 respondents). The results indicated that 54% of language service buyers use MT technology, 53% of users consider it "good enough" due to its minimal human editing requirements, and 38% assert that it is sufficient for its intended purposes. Conversely, the plethora of available engines, coupled with the necessity for resources and expertise to identify the optimal one, can render the process of implementation and management of MT engines both time-consuming and challenging. Furthermore, the quality of MT output can often appear unreliable and unpredictable. The necessity for post-editing of MT output can nullify the cost and time savings that MT offers in comparison to human translation.

The results, presented in Figure 5.15, extracted from the article published by Phrase (2023), identified five main issues that were consistent with those identified in my own workplace research: lack of technical expertise; varied needs that cannot be covered by one engine only; confidentiality concerns; difficulties in evaluating MT performance; and limitations of online platforms (Figure 5.16).

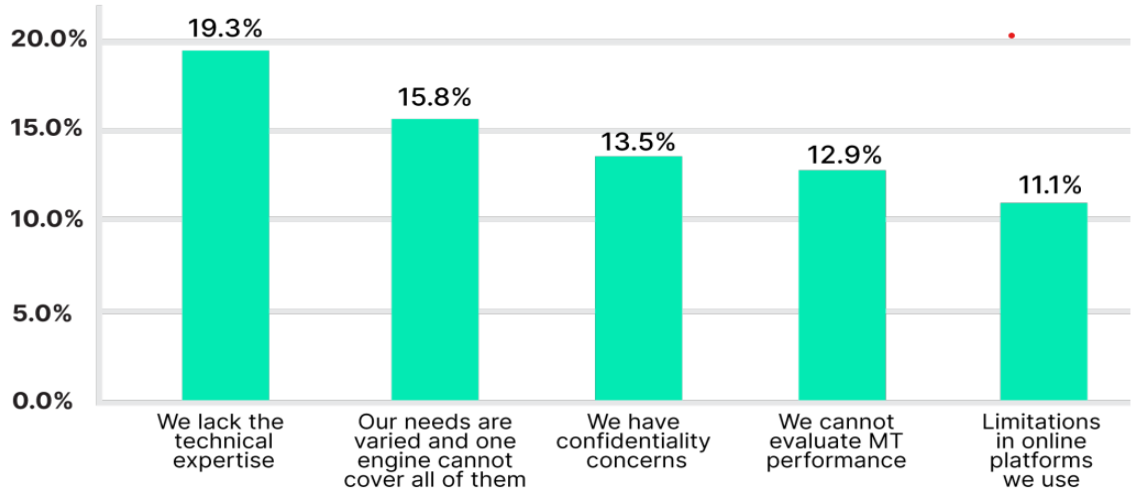


Figure 5.16 MT adoption challenges (source: Nimdzi Insights, 2023)

In the present research, the first problem, related to the lack of technical expertise, was solved by exploiting the collaboration between the university and its partner programmes with software developers who provided their technologies and expertise for academic purposes. The second problem, related to the need to have more than one engine to cover all the different needs of a company, was addressed by the augmented translation approach, so that different tools can satisfy

different needs and help to generate a variety of linguistic data (that can be exploited in different ways in a later moment). The third issue, confidentiality concerns, was addressed with the flexibility of tools to work in standalone or networked environments, as well as the use of pseudonymisation/anonymisation tools such as MAPA, which is available free of charge from the EU. The use of a tool that compares different MT engines, providing automatic scores and a list of segments rejected by the engine during the training phase, was the solution to the fourth issue of MT performance evaluation. Regarding the last issue, the collaboration with the GDPR authority provided me with useful information to address the fifth issue about the limitations of online platforms.

Chapter 6 Technology impact from an ANT perspective

6 Introduction

This study employs a dual approach, combining technical and sociological perspectives, in order to examine the impact of the introduction of translation technologies. It considers not only the changes in the workflow and in the way of performing translations, but also the changes in the relational networks, as well as the agency, autonomy, working routines, and social dynamics of all the actors involved in the research. The analytical lens provided by ANT is employed to investigate the constantly evolving relationships in the network between human and non-human actors in the typical work environment of the Ministry of Justice. In addition to the human factor, cultural and technological aspects are considered (see Section 3.3).

The present chapter will present the results of the data analysis from an ANT perspective. Section 6.1 will provide a more detailed picture of the pre-technology situation in the Ministry of Justice related to the actual use of, and attitude towards, translation technologies among participants, as well as the sources of satisfaction and motivation. Section 6.2 and Section 6.3 will describe in detail the results of the questionnaires and the interviews of each of the three phases of the project (Figure 4.3), providing a description of the evolution of the new actor network emerging in the work environment of the Ministry through the lens of ANT concepts and answering RQs 1.2 and 1.3. Section 6.4 contains the concluding remarks of the chapter.

6.1 The translation department at the Ministry of Justice: pre-technology insights

The initial questionnaire was designed to gain insights into the existing situation from a technical, social and individual perspective. This entailed investigating the utilisation of, and attitude towards, translation technologies among participants, as well as the inter-subjective dynamics between humans and machines.

The majority of participants (Table 4.1) are within the 51-60 age range, with the exception of four individuals who are within the 61-70 age range. Apart from two participants with fewer than 25 years of experience, the remaining subjects have over 25 years of professional experience (18 worked also as freelance translators before being employed at the Ministry). There are only five subjects that do not have English in their language combination or work with a single language other than English. Only one of the participants has a law degree; two others undertook a dedicated course of study during their university years. The remaining participants all specialised in the legal field while preparing for the Ministry of Justice examination and subsequently working in the Ministry. Notably, 40% of the participants indicated that they attend conferences, workshops, courses, or training related to their profession at least once a year, which demonstrates an interest in continuous professional development. In addition to their role as translators, three of the individuals also serve as proofreaders, while seven have been called upon occasionally to perform the duties of interpreters. Regarding the internal organisation of their daily work, only eight participants indicated

that they engage in collaborative work on a regular basis with a colleague in the same office or in a team of three working in the same language combination. The remaining participants, however, stated that they primarily work individually and engage in collaborative work only on rare occasions for large or urgent projects. The average daily productivity of participants can vary greatly depending on the subject, type of document, formatting of the source document, department or country involved, etc., and whether they are working in their active or passive language combination.

From a technical point of view, the participants typically used Word, Excel, Google, online glossaries, paper dictionaries, and legal sector Web sites, as shown in Figure 6.1:

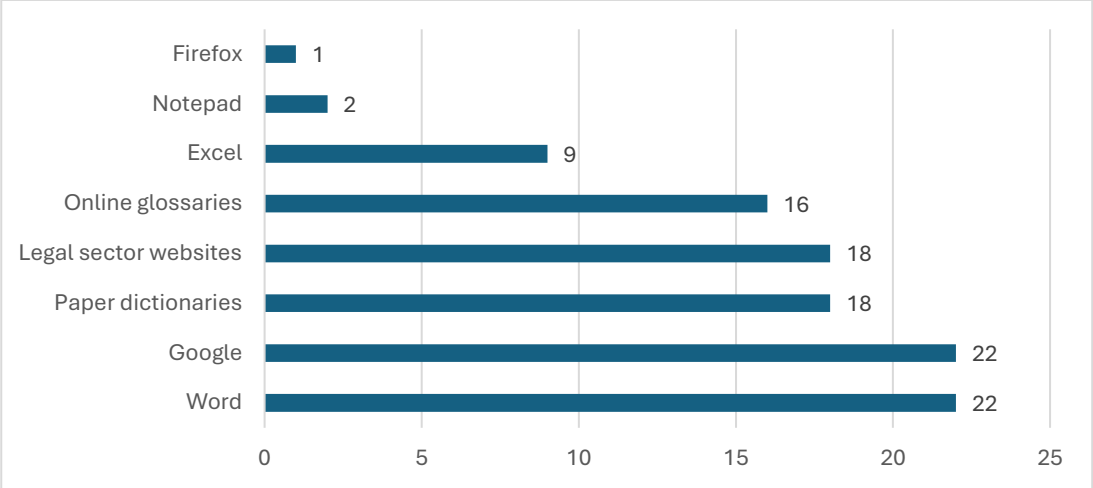


Figure 6.1 Tools used at the Ministry of Justice for everyday tasks

Interestingly, 17 participants reported terminological complexity as an element that slowed down their job (the remaining five chose the "don't know" answer), 10 participants expressed satisfaction with the resources and facilities available to them in the course of their duties, and six opted for the "don't know" response (Table 6.1).

	Frequency
Agree	4
Mostly agree	6
Disagree	1
Mostly disagree	5
Don't know	6

Table 6.1 Level of satisfaction with resources/facilities available to perform everyday tasks

Consequently, at the commencement of the fieldwork, only six participants expressed discontent with the means at their disposal for the completion of their translation tasks and sought an alternative solution and contacted me. They are the small group of translators that promoted the technological change and supported my research project in the initial stages. The data presented herewith are relevant to an understanding of the different factors that motivated the translators to participate in the intervention, their evolution over the various phases of the fieldwork, and their impact on the

outcomes of the study. The average age, well-consolidated working habits and poor IT skills constituted other fundamental elements that I had to consider when planning the training activities and the mentoring approach, in order to minimise the risk of participants opting out (more details in Chapter 5).

The first questionnaire (Appendix D) revealed that, while translators lacked familiarity with translation technologies in question, they were nevertheless driven by a strong professional curiosity. 80% of the participants found out about the existence of MT by word of mouth from colleagues, while three participants discovered it through conferences or courses. A single participant had received dedicated training in the use of Trados Studio, while another reported regular use of CAT tools without any specific training. Two more participants stated that they used DeepL and Reverso Context, respectively, on a regular basis. Even if in an institutional context like that of the DGT, for example, the use of CAT tools is very common, I found out that in the Italian Ministry environment, CAT tools are typically employed on a personal initiative basis, as evidenced by the experience of the Ministry of Defence, just to mention one example. Question 16 revealed that 13 participants utilised MT, for work or just out of curiosity, with Reverso and DeepL being the most frequently employed engines (see Figure 6.2).

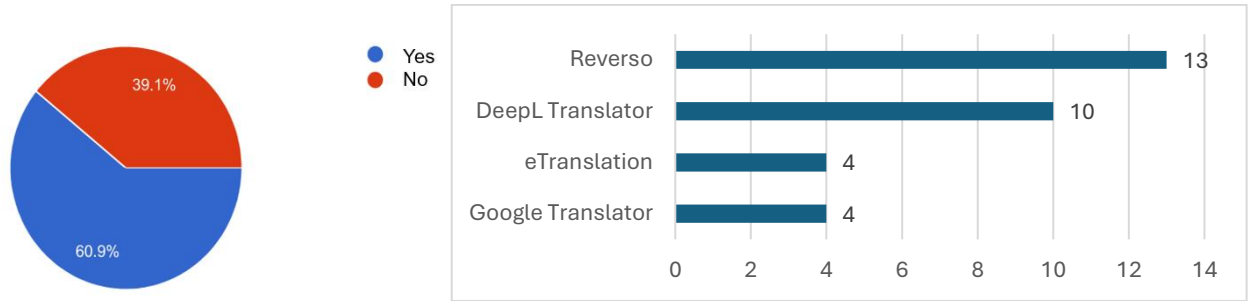


Figure 6.2 Participants using MT engines

However, it emerged that the majority of participants used free online general-purpose MT systems as a dictionary to translate single words (Gaspari and Somers, 2007), and half of them to translate single sentences. Seven participants used it to translate paragraphs and only two participants used MT to translate a full document, as may be seen in Figure 6.3.

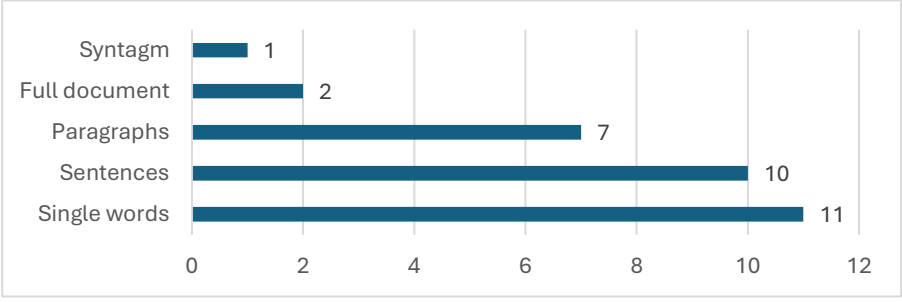


Figure 6.3 How participants used MT engines

The responses regarding free online MT may be interpreted as a consequence of the issues related to terminological complexity that was reported in the first questionnaire, as well as the attempt to find a solution with a new technology without fully understanding its proper use.

6.1.1 Attitude to technology and IT fear

The responses to question 20, which inquired about the perceived advantages and disadvantages of MT, yielded noteworthy insights into the participants' attitude towards MT. These insights are summarised in Table 6.2, which represents the answers of participants grouped according to topics and the number of participants reporting them:

MT advantages	**Num. of particip.**	**MT disadvantages**	**Num. of particip.**
speed up translation	9	lack of reliability (e,g, proper names, names of locations, job titles, metaphors, etc.)	9
provide useful suggestions and translation solutions not thought of	6	need to carefully check apparently good translation	5
provide a first draft of the translation	3	revision/proofreading requires more attention than traditional translation	5
help to understand the cryptic language of jurists	2	working on MT output is a different and time-consuming job compared to translation due to misleading solutions provided	4
prevent typing mistakes	2	faster solutions to the detriment of quality	3
standardise recurring phrases or concepts avoiding duplication	2	problems with opposites, recognition of the subject in long sentences, repeated parts and skipped words, misinterpretation of text semantics	2
		advanced age and consolidated working habits	1

Table 6.2 Advantages and disadvantages of MT according to participants

It is evident that the primary benefit of speeding up the work process is a key point of interest for the participants. However, it is also noteworthy that some have highlighted the potential of MT to suggest translation or terminological solutions that may not have been initially considered, particularly in active translation. Moreover, as indicated by two participants, MT can facilitate the decoding of texts characterised by a high degree of complexity, which is typical of those written by jurists. Additionally, according to three participants, it can offer a preliminary draft that can be employed as a starting

point for the translation process (Farrell, 2023). Conversely, the unreliability of the engine's output necessitates a more meticulous verification process (nine participants), which, when coupled with the potential for misleadingly smooth text (five participants), introduces an additional risk factor (Daems and Macken, 2019). Consequently, in the opinion of four participants the translation process may not be accelerated, but rather become a time-consuming activity. One of oldest participants identified advanced age and the presence of long-standing habits as factors contributing to the decision not to use MT. According to Cresswell et al. (2011, p. 329) "some users find it easier to adopt and integrate the new software into their work practices than others [...] the older generation tends to have more difficulties than the younger generation here are professional differences in attitudes (Travaglia et al., 2009), and differences in perceptions of benefits and usefulness (Kirshbaum, 2004)". The proposed approach to the introduction of technology in the translation process was designed to minimise the potential impact of age and to capitalise on the significant benefits of professional experience, in line with Cresswell's hypothesis that "the ability to have power is assumed to result from the way actors are connected, rather than from inherent characteristics of actors" (Cresswell, 2019, p. 89).

An additional perspective on the attitude to translation technologies more generally is provided by the answers to some questions related to participants' opinion on CAT tools and MT. At the beginning of the fieldwork, before starting the training, many participants agreed or partially agreed that such technologies could be beneficial in enhancing productivity (Q3, second part of questionnaire) (17 participants) and quality (Q4, second part of questionnaire) (14 participants), five participants selected the "don't know" option in Q3 (P11, P13, P15, P16, and P20), while one participant mostly disagreed (P11) and other seven opted for the “don’t know” answer in Q4 (P3, P13, P14, P16, P18, P20, and P21). These results may be interpreted as indicative of a positive attitude that creates expectations regarding the outcomes of the research project, despite the fact that 14 participants (P2, P5, P6, P9, P10, P11, P12, P13, P14, P16, P17, P18, P20, and P21) agreed or mostly agreed that the introduction of translation technologies into the existing workflow could be complex (Q10, second part of questionnaire). It is noteworthy that no respondents expressed concerns about being replaced by such technologies, while only two (P20 and P22) opted for the “don’t know” answer (Q11, second part of questionnaire). This may be attributed to the high level of professional and linguistic expertise required for the practice of legal translation, as well as the fact that they were employees of the ministry. However, 10 participants (P1, P2, P3, P5, P7, P10, P11, P12, P18, and P22) stated that they were not worried about becoming dependent upon translation technologies and losing some of their professional skills, another 10 (P4, P6, P8, P9, P13, P15, P16, P17, P20, and P21) selected the "don't know" option and two (P14 and P19) expressed reservations (Q12, second part of questionnaire). A particularly encouraging finding from the questionnaire was the readiness of participants to acquire new professional skills (only P16 chose the "don't know" option) (Q15, second part of questionnaire).

The two questions pertaining to IT fear yielded comparable results. A "don't know" option response was selected by eight respondents, while six (P1, P5, P8, P14, P16, and P22) indicated no concerns about potential error messages received from the programs and five (P1, P5, P8, P11, and P22) stated they were not worried of making mistakes during the utilisation of novel software. Conversely, eight participants (P4, P6, P7, P10, P12, P13, P18, and P20) expressed a certain degree of apprehension regarding the possibility of errors, while nine participants (P3, P4, P6, P10, P17, P18, P19, P20, and P21) indicated a state of anxiety when confronted with error messages. Considering these results, the mentoring period following the training phase could represent a valid strategy to mitigate the IT anxiety that may arise from both low IT skills and the average age of the participants.

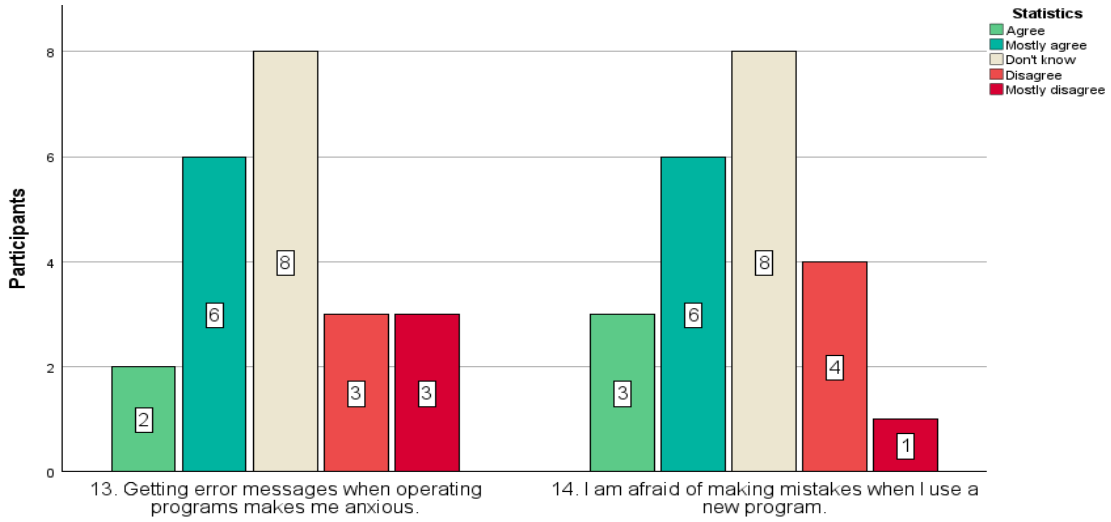


Figure 6.4 Answers related to IT fear and anxiety

6.1.2 Investigating the sources of motivation and satisfaction before technological change

Question no. 11 of the first part of the first questionnaire was open-ended, asking participants to list three things that motivate them most in their work. Table 6.3 lists the answers (shortened version) provided by the 22 translators, colour coded according to the indicators identified in Table 3.4 (BLUE, intrinsic characteristics; RED social perspective; GREEN, personal relationships and work environment; and **BOLD** autonomy).

P1	constant research and study; enhancing language skills
P2	interesting subject matter; **a pleasant working environment**; professional growth
P3	difficulty of the job; new topics;
P4	satisfaction in doing good quality work
P5	contribution to achieving the Ministry's objectives
P6	constant enrichment and improvement of language skills
P7	searching for solutions requiring real language mediation.

P8	learning of new concepts and terms
P9	practical aspects of the work required
P10	research and study activities; usefulness of the work
P11	terminology research; content research; language improvement
P12	curiosity; providing a quality service to the public; improving myself
P13	content of the acts; learning by translating; impact of my work on society
P14	**autonomy**; variety of work; terminology research
P15	research; **autonomy**; creativity
P16	**autonomy**; **independence**; variety of translations
P17	my job is very interesting; useful and instructive
P18	provide a service to the public; working with a language I love; constant study and research
P19	various types of documents; linguistic research; **good cooperation with some colleagues**
P20	**autonomy**; continuous research and learning
P21	terminological research; uniformity of translated texts; topics covered
P22	satisfaction in the work completed; continuous study and research; **collaboration**

Table 6.3 List of factors motivating participants colour coded according to intrinsic characteristics, social perspective, personal relationships and work environment, and autonomy

As shown in Table 6.3, 21 participants highlighted factors pertaining to the intrinsic characteristics of the work itself (such as the diversity of subject matter, the necessity for continuous linguistic research and learning, finding translation solutions, challenging tasks, etc.) (see Section 3.5). These observations align with the findings of other studies presented in Section 2.3, which suggest that the primary source of motivation for translators is their passion for the work itself. Other relevant factors reported by few translators were: the responsibility of the social impact of their work (mentioned by six participants), that is the possibility of providing a useful service to the public; the **collaboration** with the other colleagues (mentioned by two participants); and a single response related to importance of a **pleasant working environment**. The final factor identified by four participants is **autonomy**. The approach devised for the present study was developed with the objective of making all these factors emerge spontaneously in order to assess the impact of translation technologies deployment on them in comparison with this initial state.

The third section of the initial questionnaire was devoted to the factors that could potentially contribute to satisfaction (or dissatisfaction), as well as motivation. As explained in Section 4.8.1, the

questions were adapted from other questionnaires to align with the objectives of the research, the characteristics of the participants, and the work environment of the Ministry of Justice. The questions were formulated according to the facets defined in Section 3.4.2 (work environment, individual satisfaction, professional aspects):

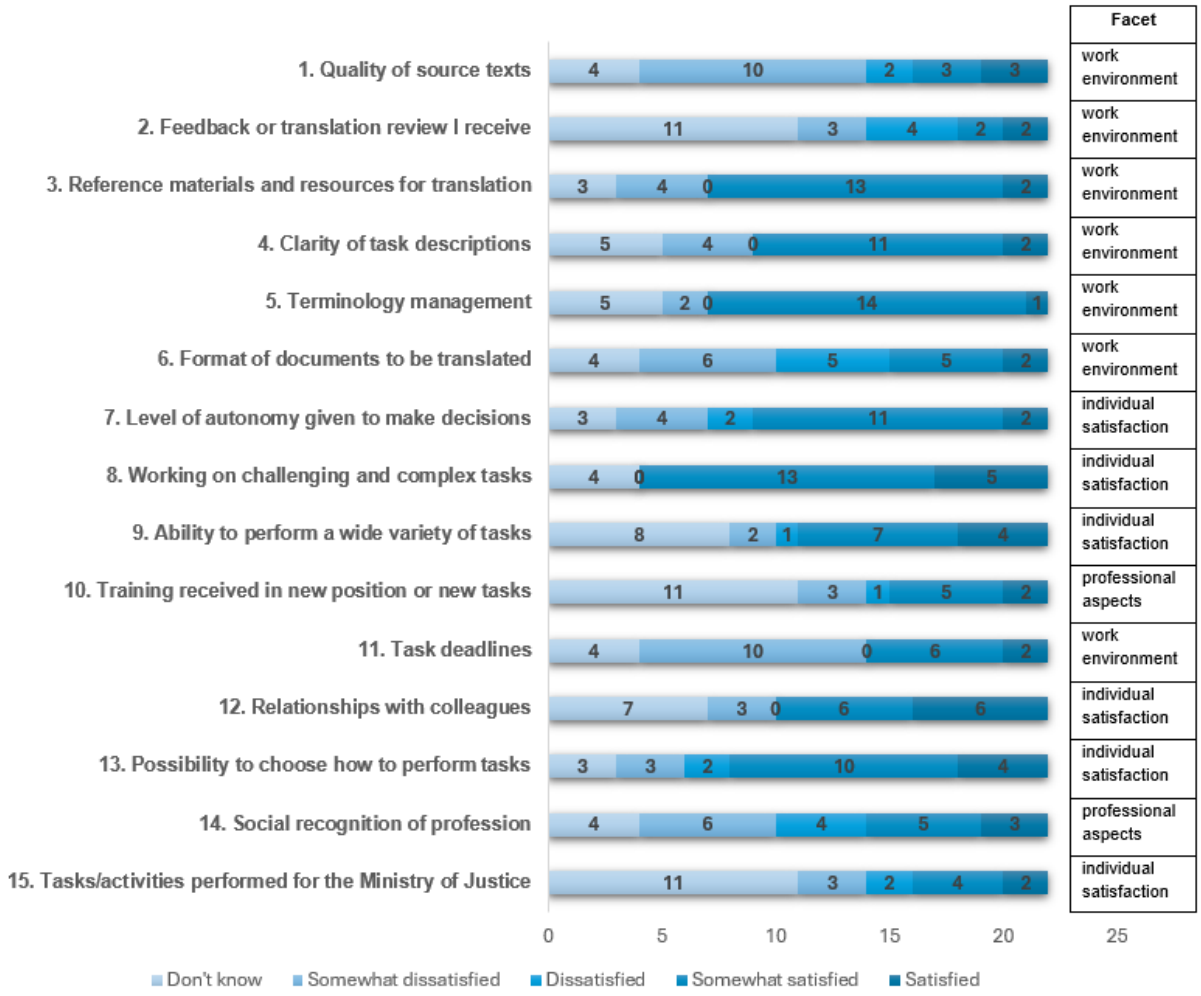


Figure 6.5 Visual representation of the answers to the third part of questionnaire

The results indicated that autonomy in making decisions (Q7, third part of the questionnaire), working on challenging tasks (Q8, third part of the questionnaire), and the possibility to choose how to perform a project assigned (Q13, third part of the questionnaire) (all under the facet "individual satisfaction") are sources of satisfaction for the majority of participants (respectively, 13, 18 and 14 participants), which appears to be in line with the augmented translation principles (Section 2.2.1). From a technical standpoint, 10 participants expressed significant discontent with the quality (Q1, third part of the questionnaire) and 11 the formatting (Q6, third part of the questionnaire) of the source texts (quality that could potentially impact the implementation of NMT), while in both cases six participants declared that they were quite satisfied and seven completely satisfied. Interestingly, considering that the revision cycle was not integrated in the typical workflow of the ministry, 11 respondents opted for the "don't know" answer related to the satisfaction with feedback and reviews

(Q2, third part of the questionnaire), orientation or training received in new position or tasks (Q10) and the activities performed for the Ministry of Justice (Q15, third part of the questionnaire). The reason for such results may be attributed to the fact that each translator was solely accountable for the quality of their work, and only on rare occasions they were provided with feedback or specific training to undertake new tasks. This was due to the rare occasions on which they were required to perform activities that differed from those typically associated with translation within the Ministry.

Another notable and encouraging point of departure for the implementation of technologies is the degree of satisfaction expressed by 15 translators with the availability of reference materials and other resources necessary for translation (Q3, third part of the questionnaire) and terminology management (Q5, third part of the questionnaire). This is advantageous for the collection of linguistic data necessary for the training of NMT engines because translators have shared and established reference points. In terms of the characteristics of the tasks they perform, 13 respondents indicated that they were somewhat satisfied or satisfied with the clarity of the description provided (only four expressed dissatisfaction) (Q4, third part of the questionnaire) and 11 with the variety of tasks (Q9, third part of the questionnaire). It is noteworthy that eight participants (P3, P4, P5, P7, P12, P15, P19, and P20) selected the "don't know" option in response to this statement. This is because, based on the analytic memos related to the in-situ observation and informal conversations with these participants, it can be inferred that they occasionally experienced boredom when performing their daily activities that were perceived as repetitive. However, task deadlines (Q11, third part of the questionnaire) may present a challenge, as 10 respondents indicated some level of dissatisfaction, while eight expressed satisfaction. The objective of Question 14 (third part of the questionnaire) was to ascertain whether the issue pertaining to the social recognition of the profession among employed translators, as discussed in Section 2.2.1, could potentially serve as a source of dissatisfaction within this working context. The proportion of participants who expressed a degree of dissatisfaction (10 participants) was marginally higher than those who indicated a degree of satisfaction (eight participants), while four opted for the "don't know" answer; thus, the issue may still require further attention.

Question 12 (third part of the questionnaire) concerned the level of satisfaction with the quality of relationships with colleagues. 12 participants indicated that they were quite or completely satisfied, while three expressed dissatisfaction and seven selected the "don't know" option. It should be noted that 14 participants in the first section of the first questionnaire reported working individually on a regular basis and only occasionally in collaboration with other colleagues. The data is also of interest in evaluating the potential impact of work habits on personal relationships and the limited relevance of interpersonal relationships to job satisfaction, as confirmed also during the first interview (Section 6.2.2). Therefore, the aforementioned figures represent the initial situation and the starting point for the analysis of the social perspective of the present research with the aim of answering in particular

the RQs 1.2 (What is the impact of non-human actors on the internal network of participants from an ANT perspective?) and 2.3 (Does the social dimension influence attitude?).

6.2 Phase I: training and the introduction of the new actors in the network

The fundamental tenet of ANT is that human and non-human actors are interrelated and play a significant role in shaping the translation^{ANT} process through constant dynamic interrelations of a network. "A good ANT account is a narrative or a description or a proposition where all the actors do something and don't just sit there" (Latour, 2005, p. 128). In particular, in the translation sector, according to ANT a production network can be described as a set of dynamic interrelations: translators are not seen as exclusive decision-makers, but as actors who are influenced by a network of elements present in the translation process. ANT analyses, in terms of four moments of translation^{ANT}, the shifting relationships between actors or micro-actors (i.e. individuals) in the process of forming alliances, enrolling other actors, and using artifacts (i.e. translation tools) to reinforce such alliances, thus creating heterogeneous networks that act as if they were independent autonomous actors (referred to as "actor networks"). According to Latour (1986), human societies are distinguished by the incorporation of non-human resources into social relationships, thereby reinforcing the durability of a particular definition of society. The creation of artefacts is a consequence of the assignment of social roles to non-human entities, which serve to establish transitional bonds between actors. A fundamental issue pertaining to the role of "non-living" artefacts as actors is the question of how such entities can be defined as having interests. One potential response to this question is that the interests of an artefact can be seen as analogous to the interests that have been inscribed in it. In the present research, the interest inscribed in translation technologies is that they should support and facilitate translators in their everyday translation activities. Human actors in the Ministry of Justice had to align their particular interests (e.g., speed up translations, manage higher volumes, improve translation process etc.) and through reiterated negotiations and inscription transferred these interests to non-human actors. Latour (1987) states that the process is influenced by the expected outcomes, the tools deployed, the interest inscribed by each actor and the level of resistance/betrayal that could be opposed to the inscription. In fact, he also posited that the incorporation of any entity into the network could potentially give rise to an increased likelihood of resistance or defection. In contrast to the reinforcing of provisional ties with the objective of reaching irreversibility, that is, the point at which return is no longer feasible, non-human actors can be prone to unpredictability and instability. As clarified by Callon, the act of translation^{ANT}, involving the process of representing or speaking on behalf of another individual, constitutes an exercise of power, and as such could give rise to the possibility of resistance, leading to "treason" (Callon, 1986b, p. 219). The actions of human and non-human actors can deviate from the agreements (translations^{ANT}) achieved by their representatives: this behaviour can be described as a form of betrayal (e.g. a program that does not work as expected, an individual that does not accept nor wish to learn new tools, etc.).

As explained in Section 3.3.1, the four moments of translation are: problematisation, interessement, enrolment and mobilisation. They relate to the emergence, growth, and acquisition of stability of a network of aligned interests. The formation of a stable network depends on the successful implementation of these four moments of translation^{ANT}, driven by a focal actor and supported by all actors in a network who maintain their alignment with the OPP. The OPP is a "situation that has to occur for all actors to be able to achieve their interests as defined by the focal actor" (Sarker et al., 2006, p. 56). In the context of the present research, the OPP was all the actions required to introduce the translation technologies (e.g., installing the programs on PCs, learning how to use them, complying with security requirements, experimenting in the use of them with legal documentation etc.).

6.2.1 Initial phases of the research project: problematization, interessement and enrolment

In the present research the design of the translation^{ANT} process aimed not only to meet the needs of translators in order to provide a specific solution, but also to test a participatory/bottom-up approach (Section 4.11) to the introduction of translation technologies. The solution is translated^{ANT} to complete a task (i.e. training of a dedicated NMT engine to be used in combination with TMs and TBs) and actions are translated^{ANT} to specific results (i.e. creation of TMs and TBs, creation of new common rules for storing translations on the PCs, collection of linguistic data to train the MT engine, etc.). Inscriptions (i.e. alignment procedure to leverage old translations, adoption of a new workflow, pseudonymisation of documents, creation of a common repository to share linguistic data, etc.) ensure that actors' interests are protected. The objective of the translation^{ANT} process is to achieve irreversibility (i.e. full deployment of translation technologies in the translation department with no obvious advantage to stop using them).

ANT can elucidate the manner in which the social perspective associated with translation technologies (and the researcher) and the work environment can impact the participants' motivations, satisfaction, and attitude to the adoption of a new workflow introduced by the technological shift. This can be achieved by gaining insight into the factors that motivate them to utilise translation tools and the sources of satisfaction that could enhance their attitude and motivation to employ such technologies. The first step of translation^{ANT} is *problematisation*, that is the definition of an opportunity for an actor to propose a solution to a problem. The proposed solution becomes the OPP. The formation of the network of aligned interests was initiated by one of the translators in Group A (Section 4.6) that enrolled me as a focal actor. My role as facilitator was to suggest the appropriate use of technology and change of internal processes for the translation workflow. I therefore proposed my research project to the Head of Department in order to involve the Ministry of Justice in my research at the workplace and to test the potential of translation technologies to solve the problem of increasing translation volumes experienced by them in recent years. During the problematisation phase I identified the relevant actors and established how they

were affected in order to evaluate the possible ways to address the problem and establish the OPP (learning how to use CAT tools integrating TMs, TBs and NMT and pseudonymise the documents).

In the second step, *interessement*, I tried to involve other actors to support the new opportunity proposed in the problematisation phase. Consequently, after obtaining the approval from the Head of Department, consulting with the Ministry's IT department about any potential issue or risk, and discussing the risks and options with the data protection supervisor, I was authorized to arrange an online meeting (due to pandemic restrictions) with all the translators to explain the details of my research project, describe the objective of the study and define the terms to take part in the intervention.

Then I moved on to the third step, *enrolment*, which "is a negotiation process to exhibit how the interessement meets the actors' interests and needs and persuades them to accept the new actor-network" (Carol, 2014, p. 127). During enrolment phase, the Head of Department shared my research project with the Head of Office II of the same department. Consequently, we had a meeting where I reported the project and the expected outcomes, and the Head of Office II asked me to propose the intervention to the four translators working on ECHR documentations (located in the same office as Group B) (Section 4.6). These are the preliminary phases that resulted in the participation of all the linguists of the Ministry of Justice in the research project.

I shared with all the actors the strategy I wanted to use to implement a gradual deployment of the translation tools, in order to fine-tune the training and the following mentoring phase according to their IT skills and the characteristics of the documents to be translated (Section 5.3). This stage served to define the role of the actors in the network of aligned interests. Alliances were strengthened by artifacts (the CAT tool) which were inscriptions of the interests of the network and its actors. It was essential to ensure the stabilisation of the actor-network during translation^{ANT}, as there was a risk that human and non-human actors may betray the network despite successful interessement. Consequently, the commitments made by each actor were inscribed in the form of guidelines to direct the role of the actors. This inscription helped to mobilise actors into action through agreed procedures, based on some guidelines provided by me.

The actors enrolled were:

- the participants, divided in Group A (starting the training in April 2022) and Group B (starting the training in October 2022) (Figure 4.4);
- the researcher (me), acting also as the focal actor (invested by the participants promoters of the research project) who *interested* and *enrolled* other actors to obtain their support in the change process;
- the IT department supporting the participants and me as the researcher, trainer and mentor over the whole duration of the study to install and manage the programs, tackle formatting

problems of documents to be translated, book the training rooms and obtain the pass to access the Ministry;

- the Head of Department authorizing participants to take part in the various training sessions and the IT department to install programs and provide support where necessary;
- the data protection supervisor;
- the CAT tool and the NMT engine that were introduced in the translators' work process.

6.2.2 Mobilisation: interests and expectations after the training

The fourth step of translation^{ANT} was mobilisation, which is a process to ensure that actors represent the interests of the other actors. As an initial activity, participants completed an anonymous questionnaire aimed at defining the starting situation (Section 4.8). The data collected with the first questionnaire were useful also to understand what motivated individuals (during the problematisation and interessement stages) to adopt translation technologies or what would encourage them to use the new tools, while the enrolment stage revealed the antecedents for mobilising the actors into action. After the training, all participants agreed to have a mentoring period with me to progressively introduce translation technologies into their daily activities (this is described in more detail in Section 6.2.3).

In the post-training interviews, I chose not to explicitly mention interpersonal relationships in the question formulation. This was done to allow the topic to arise spontaneously from the participants in response to a stimulus that provided them with the opportunity to express their personal opinions. In fact, as reported by the participants during the first meetings, there was no translation department or unit, as it had been disbanded about ten years earlier and the translators had subsequently been allocated to the two different locations. Based on their reports, cooperation and teamwork were not considered essential for improving working conditions or translation quality (Section 6.2.1). Interacting with each participant during the mentoring phase, it became clear that they trained themselves on the job, spending a significant amount of time in archives, using paper dictionaries, or searching the internet individually for linguistic improvement. Furthermore, each linguist was responsible for translating the documents. At the end of each translation, the linguists signed the documents, as is commonly done with sworn translations. They had good linguistic experience and seldom consulted each other on specific translation issues or leveraged the work of their colleagues, mainly due to time pressure and tight deadlines. The prevailing perception of the translation task was that it was an activity to be performed alone, contrary to the prevailing tendency towards concurrent translation as a means of increasing productivity (Gough et al., 2023). One of the causes of this attitude could be the lack of an agreed or planned translation management system. Translations were assigned by colleagues with no experience in the translation field, based on deadlines and the availability of linguists. As teamwork, collaboration and linguistic data sharing are essential features of translation technologies, it was crucial to monitor this situation throughout the

research project. It could potentially lead to dissatisfaction or betrayal or, conversely, stimulate satisfaction and motivation.

At the end of the training period in Group A, in the first interview (Appendix D) four out of seven linguists introduced the ideas of "sharing TMs and TBs to improve translation quality" (P2), "synergy with colleagues to share not only linguistic solutions but also doubt" (P5), "speed up jobs by sharing linguistic choices" (P7) in response to question no. 2, which asked about how translation technologies can help them. However, when in the third section of the questionnaire they were asked about potential issues related to the use of translation technologies (Q3), P3 stated that teamwork was necessary and could help "break down silos". This was the first time that the lack of teamwork has been identified as a potential obstacle to the implementation of translation technologies. The same linguist also expressed satisfaction with "learning in a group" in question no. 4.

In the preliminary interview with Group B, the scenario changed. Of the 15 participants, four (P9, P18, P19, P22) focused on the concept of sharing and collaborating with their colleagues. In response to the recommendations proposed by Group A, participant P12 suggested capitalising on them, which resulted in a positive outcome in question no. 4. However, participants P13 and P22 in question no. 3 indicated a reluctance to utilise the solutions proposed by their colleagues, predominantly due to a lack of trust in their linguistic competencies. Moreover, participant P5 posited that, at the individual level, there were no issues and that the approach to work was simply different. Nevertheless, if a group of translators were to employ this collaboration with the intention of standardising their translations, it could result in a loss of nuance. Consequently, the concept of teamwork was perceived not as an opportunity, but as a potential threat to the quality of translations and the professional autonomy of individual translators.

It is also noteworthy that only a subset of six participants (P2, P5, P6, P8, P11, and P12) proposed leveraging translation technologies to address the challenges associated with the growing volume of translations resulting from the expansion of the network of foreign contacts in recent years. As evidenced by statement no. 15 of the second section of the first questionnaire, 21 participants out of 22 where motivated to acquire a new professional skill and that is the reason why they decided to participate in the intervention, potentially with the intention of enhancing existing work practices without making substantial alterations as evidenced during the first interview (P9, P10, P12, P13, P14, P15 and P19). In light of the aforementioned circumstances, it was possible that attitudes towards translation technology would vary and could exert a considerable influence on the stability of the novel actor network that was to emerge. Considering the established advantages of translation technologies, the necessity to develop a new workflow and to foster collaboration and the sharing of linguistic data, the mentoring period proved to be a crucial element in enabling the new actor network to attain stability and reach a point of irreversibility (as highlighted by the second interview, Section

6.2.3). In addition to the evolution of the relationship between the participants and towards the new tools, ANT represented also a good method to evaluate the agency.

6.2.3 Phase II: mentoring period, interests and alliances

Following the conclusion of the training programme, I conducted one-to-one meetings with each participant during the mentoring phase, with approximately two hours per week dedicated to each translator. This was in accordance with a weekly schedule that had been previously agreed with the participants (for a period of approximately three months with each group). The objective of this activity was to reinforce the IT skills of participants, encourage them to utilise the tools immediately following the training, and, in particular, to avoid discouragement due to the typical issues (e.g. need to arrange folders in a different way, duplication of files, inability to solve problems producing error messages, etc.) that can be faced when a new tool is introduced into a consolidated workflow. From my experience as a CAT trainer and technical support for companies and organisations, it became evident that the period immediately following intensive training is of the utmost importance for translators to consolidate their learning and establish a positive relationship with the tools. I addressed any queries regarding the utilisation of the software, attempted to resolve any formatting issues pertaining to the documents in question, offered suggestions and addressed any queries or concerns pertaining to the functionality of the software in the context of their daily activities. This period facilitated the establishment of personal relationships with each participant and provided insight into the working environment.

During this period, the participants and I presented all the technical issues related to the poor formatting of files, obsolete PCs on which it was not possible to install programs (temporarily solved with the use of PCs borrowed from other departments), and the pseudonymisation tool we had to use in order to prepare linguistic data for NMT training (Section 5.2). These issues were presented to the IT department and the Head of Department, who were asked to resolve them in order to facilitate the proper deployment of all the necessary tools in the translation workflow.

In the second questionnaire after the mentoring phase that lasted about three months after the conclusion of the training, the participants had to express their level of agreement and this time I inserted an explicit statement (Q30) (Appendix D) to verify whether the translation technologies affected interpersonal relationships with colleagues. There was nearly a balance between the participants that agreed or mostly agree (eight participants), those who disagreed or mostly disagree (seven participants) and those who opted for the "don't know" answer (seven participants) (Figure 6.6).

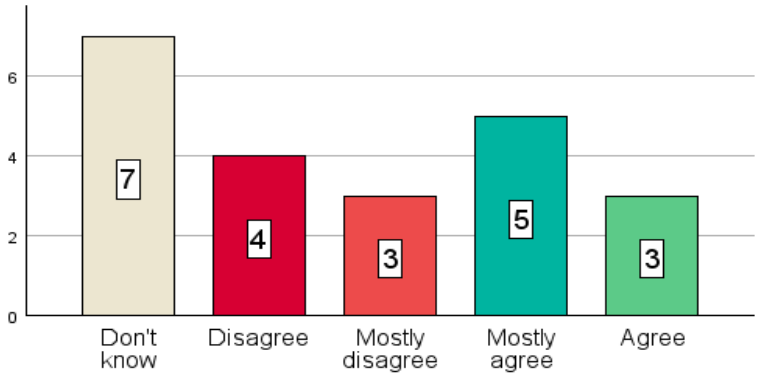


Figure 6.6 Participants' opinion (Group A and B) on whether translation technology affects interpersonal relationships with colleagues

According to ANT, for the actor network to reach a state of stability, it is necessary to create alliances between actors based on personal relationships. As evidenced by the interview and the analytic memos, some participants exhibited greater sensitivity to the impact of translation technology, perceiving it as a beneficial phenomenon and an opportunity for advancement. Conversely, other participants demonstrated a tendency to disregard this effect, prioritizing the maintaining of their pre-existing work habits. The participants who selected the "don't know" option chose to refrain from expressing an opinion and instead opted to observe the developments.

The remaining items in the questionnaire (Group A and B, Phase II) were useful in outlining the evolution in the level of interest and commitment of the actors involved, as well as in identifying any potential issues that could impede the translation^{ANT} towards irreversibility. The initial statements pertaining to the willingness to use CAT tools more frequently, terminology management tools and automatic translation were corroborated by the findings, which demonstrated that the majority of actors expressed willingness to use translation technologies, as illustrated in Figure 6.7:

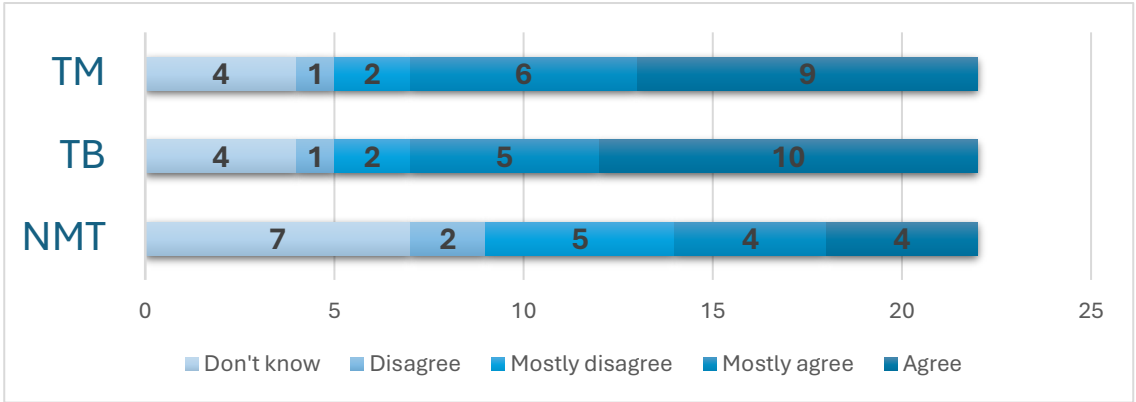


Figure 6.7 Participants' willingness to use TMs, TBs and NMT more frequently

It is important to note that during the initial stages of training and mentoring, participants were only able to test generic NMT integrated into the CAT. This was due to the necessity of collecting sufficient linguistic data to populate TMs and perform the first training of the NMT engine (Section 5.5).

Figure 6.8 illustrates the participants' opinions regarding the tools they have been learning and using for approximately four months, as well as their commitment to the core actions required by the OPP and the formation of the new actor-network (questions were shortened to fit the graphic, the full version is reported in Appendix D):

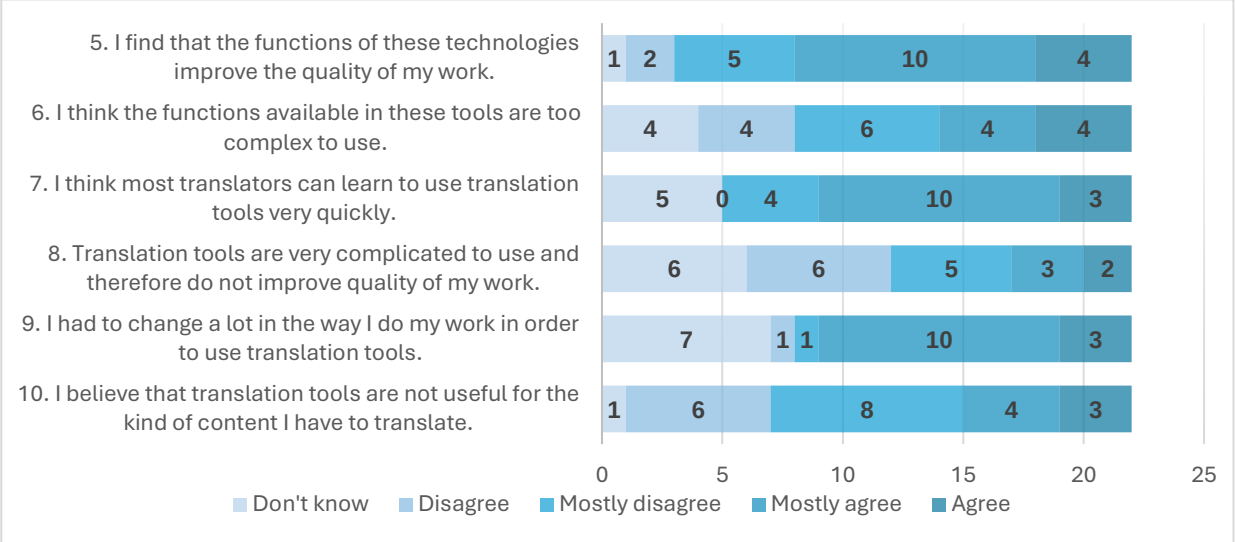


Figure 6.8 Participants' opinions about translation tools learnt

In general, 14 participants (P2, P3, P4, P5, P7, P8, P10, P12, P13, P15, P17, P19, P21, and P22) agreed or mostly agreed that the functions of translation tools improved the quality of the work (Q5) and 13 participants (P1, P2, P4, P5, P7, P8, P11, P12, P15, P16, P17, P21, and P22) agreed or mostly agreed that they could be learned relatively quickly (Q7) even if such tools required a change in the way of working for 13 participants (P2, P3, P4, P5, P7, P8, P9, P12, P13, P14, P15, P17, and P20) (Q9). Eight respondents (P6, P9, P10, P14, P17, P19, P20, and P22) declared that the functions of the tools were overly complex to use effectively (Q6) and five of them (P6, P10, P14, P17, and P20) concurred that the tools were so complicated that they did not enhance the quality of the work (Q8). Seven participants (P9, P11, P14, P15, P16, P18, and P20) agreed or mostly agreed that tools were not useful for the kind of documentation they were translating (Q10) and it is noteworthy that both in Q5 and Q10 only one participant (P6) opted for the "don't know" answer, demonstrating that the mentoring period facilitated familiarity with the technologies in question, enabling comprehension of their principal characteristics, and reducing obstacles to utilisation of the tool defined as “complex”, as confirmed by Q11 below (Figure 6.9):

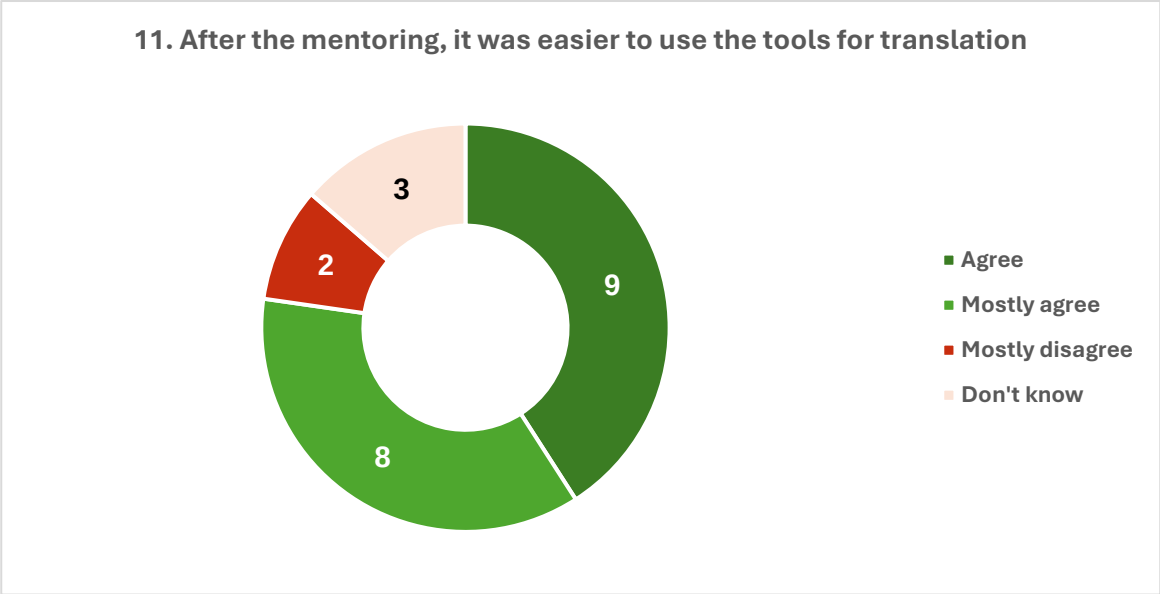


Figure 6.9 Participants' opinion on efficacy of mentoring

A further noteworthy finding was the data pertaining to IT fear and technology anxiety, as reflected in the results of the second questionnaire. Based on my experience as an official CAT trainer, the in situ mentoring phase is not a typical component of translation tools training provided by software developers. The customers are provided with an analysis of their documentation and requirements, followed by a two- or three-day training session and the option of additional training support via email or telephone for a limited period following the in-situ training. In light of the age range of the participants (Table 4.1), their limited IT skills and the established workflow that made minimal use of technology (Figure 6.1), I considered appropriate to integrate the mentoring phase as an essential element to facilitate the introduction of translation technologies, offer positive reinforcement to translators' attitudes towards translation tools (Table 6.2) and reduce the IT fear and anxiety observed with the first questionnaire (Figure 6.4):

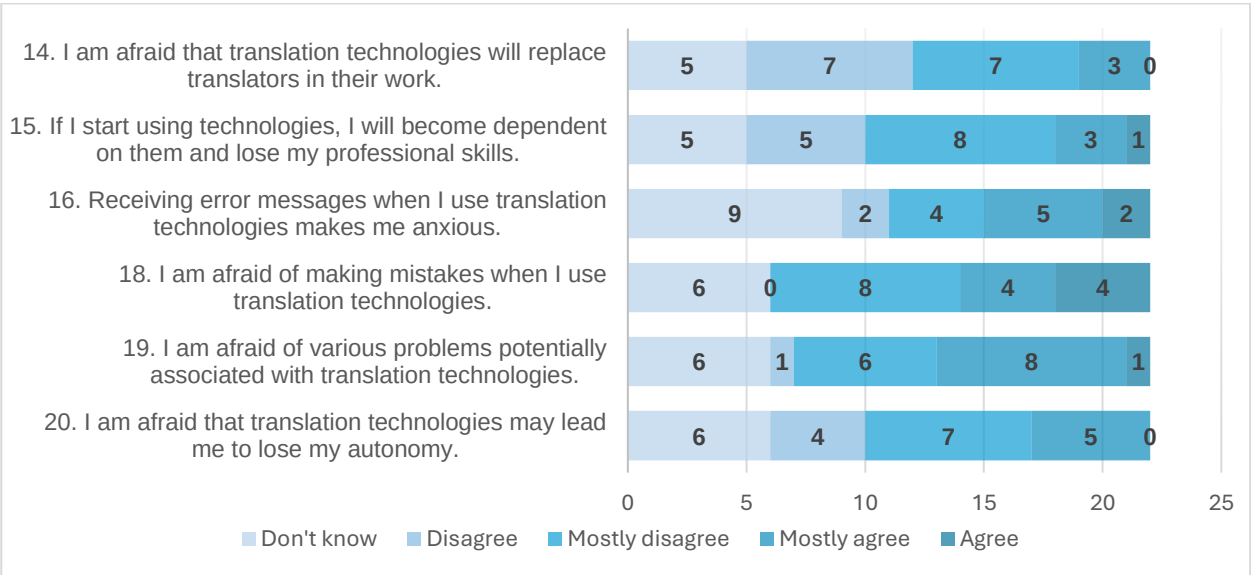


Figure 6.10 Findings related to participants' IT fear and technology anxiety

Three participants (P10, P12 and P14) indicated that they were concerned about being replaced by translation technologies (Q14) and five participants (P6, P7, P19, P20 and P22) opted for the “don’t know” answer. A discrepancy is revealed when the same question from the initial questionnaire (Q11), where no concerns were expressed, is considered. This discrepancy may be indicative of an initial effect of the training phase and the emergence of a new awareness related to translation tools. This assumption is substantiated by the responses to the identical question (Q14) in the third questionnaire, administered at the conclusion of the research project. Five participants (P6, P10, P12, P13, and P14) articulated apprehension regarding their potential replacement by MT, while the number of participants selecting the "I don't know" option increased to six (P8, P11, P15, P16, P19, and P20) (Figure 6.11).

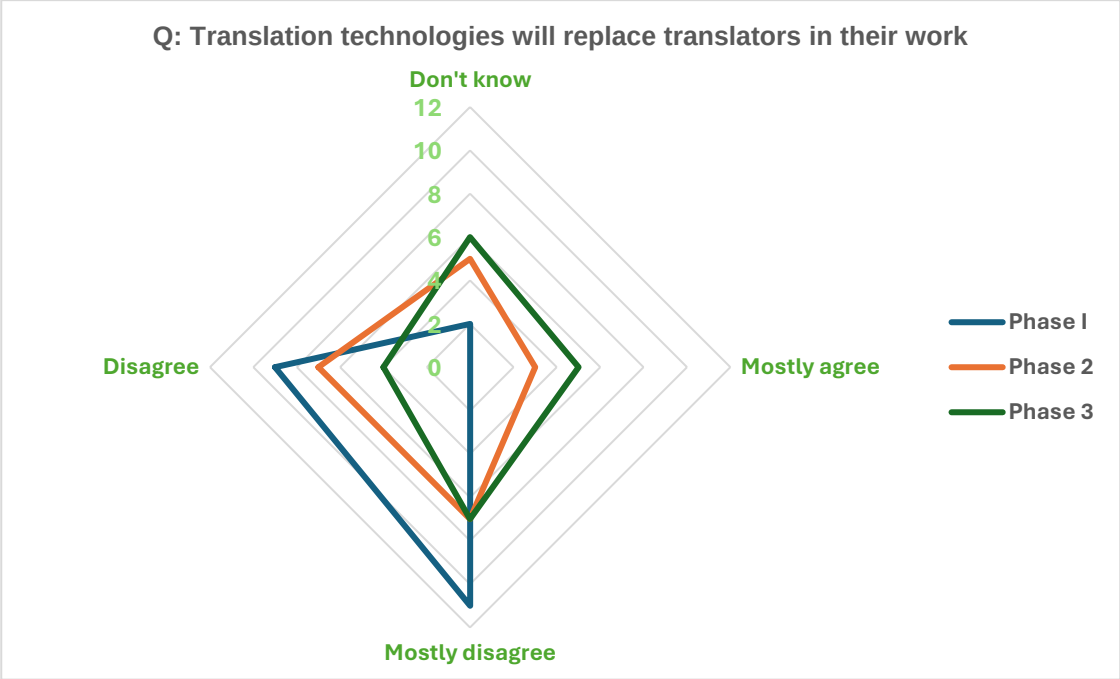


Figure 6.11 Impact of the increased awareness of translation technologies on participants’ opinion

Additionally, four participants (P6, P10, P14 and P20) reported feeling uneasy about becoming dependent on translation technologies and losing their professional skills (Q15) (Section 2.5), and five (P8, P9, P13, P17 and P22) chose the “don’t know” answer. It is noteworthy that in the initial questionnaire, only two participants (P14 and P19) predominantly concurred with this identical assertion (Q12), while four opted for the "I don't know" response (P9, P13, P17, and P21).

Another noteworthy finding pertains to the significance attributed to autonomy by the participants. As evidenced in the first questionnaire, autonomy was identified as a key source of satisfaction and motivation in the daily activities of linguists (see Tables 6.3 and 6.4). One of the principal objectives of the participatory/bottom-up approach employed in the research project was to preserve the autonomy of translators (see Section 3.1). In the second questionnaire, five participants (P6, P10, P14, P17 and P20) expressed apprehension about the potential loss of autonomy resulting from the

implementation of translation tools (Q20). Of the remaining participants, 11 mostly disagreed or disagreed, and six (P3, P7, P9, P15, P19 and P22) opted for the "don't know" answer. In the third questionnaire (Q12), the proportion of responses remained largely unchanged. Six participants (P1, P6, P7, P13, P14 and P20) expressed concern about the potential loss of autonomy, 12 mostly disagreed or disagreed, and four (P11, P15, P16 and P19) opted for the "don't know" answer. The results indicate that the introduction of translation technologies did not have a significant impact on the perceived autonomy of participants.

The proportion of participants who reported feelings of anxiety while utilising translation technologies increased moderately in relation to error messages generated by the tools. Seven participants (P2, P4, P12, P14, P18, P19 and P20) indicated that they either agreed or mostly agreed with Q16, which pertains to feelings of frustration derived from receiving error messages. Additionally, eight participants (P2, P3, P4, P7, P14, P17, P19 and P20) indicated that they either agreed or mostly agreed with Q18, which pertains to concerns about potential errors in the utilisation of the various functions. It is also noteworthy that a considerable number of participants selected the "don't know" option, specifically nine in Q16 and seven in Q18. A comparison of these findings with those reported in the initial questionnaire, which pertains to the same items (see Figure 6.4), reveals a non-significant reduction in the percentages (one participant). Therefore, the training and mentoring did not achieve the intended outcome of reducing IT fear and technology anxiety (see Section 3.6), expressed by numerous participants during the training phase. This is corroborated by the fact that nine participants (P3, P9, P10, P11, P14, P16, P17, P19 and P20) indicated a fear of potential issues associated with the utilisation of translation technologies (Q19), and also the number of participants who selected the "don't know" response in this question (six in total: P6, P7, P8, P13, P15 and P22) is consistent. The reason for this outcome may be attributed to the fact that during the mentoring phase, it was not possible to allocate the same number of hours to all participants due to the unavailability of some translators resulting from illness or other commitments (P06, P14, P18, and P21). Furthermore, 12 participants indicated that they would require the assistance of a qualified person to utilise translation tools (Figure 6.12, Q4). This was also part of the rationale behind my decision to provide distance consulting in Phase III, with the objective of assisting translators to achieve complete autonomy.

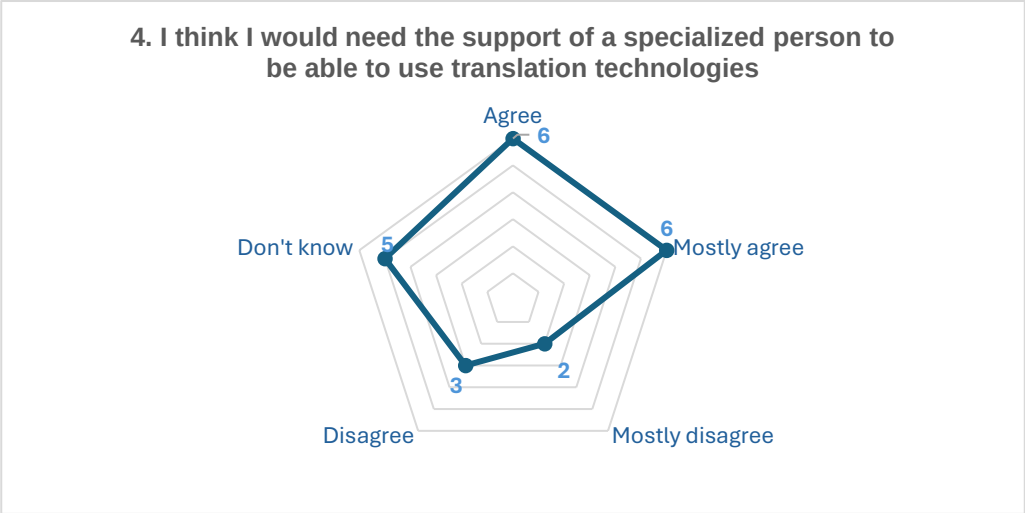


Figure 6.12 Findings related to participants' need for support by a specialized person

The subsequent items in the questionnaire were designed to ascertain whether the translation tools met the expectations of the participants and had a beneficial or detrimental impact on their approach to daily translation activities (Figure 6.13).

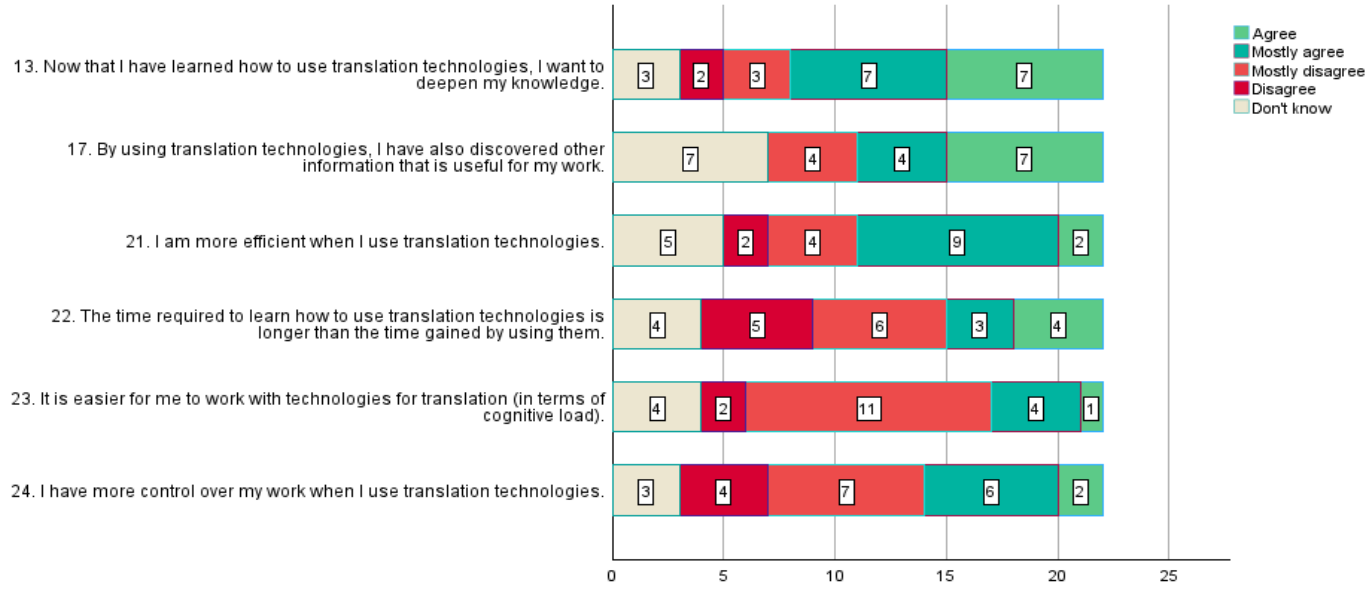


Figure 6.13 Findings related to participants' opinion about the translation tools and their utility in their work

As shown in Figure 6.13, 14 participants (P1, P2, P3, P4, P5, P7, P8, P10, P12, P13, P17, P19, P21 and P22) indicated a desire to deepen their knowledge of how to use translation technologies (Q13), while 11 participants (P2, P4, P5, P7, P8, P10, P12, P13, P15, P17 and P21) reported discovering additional useful information for translation work (Q17), and 11 participants (P1, P2, P3, P4, P5, P8, P10, P12, P13, P21 and P22) stated that they had become more efficient when using translation technologies (Q21). Indeed, 11 participants (P1, P2, P3, P4, P5, P8, P12, P13, P18, P19, and P21) indicated that they had gained more time using the technologies than had been invested in learning them (Q22). The finding that seven participants perceived the time required to learn translation tools

to exceed the time gained using them provides further evidence of the perceived steep learning curve reported after the completion of the training phase and represented an additional source of demotivation for them. Conversely, a number of participants indicated disagreement or strong disagreement with these four items, with a range of four to six individuals expressing this opinion. The findings suggest that at least half of the participants found the translation tools beneficial, thereby confirming their motivation to further develop their knowledge and proficiency in the use of translation technologies. This is despite the fact that 13 participants (P2, P3, P4, P5, P7, P11, P12, P13, P15, P16, P18, P19 and P21) indicated that the cognitive load required is considerable (Q23) and that 11 participants (P1, P7, P9, P10, P11, P14, P15, P16, P17, P18 and P20) feel they still lack complete control over such technologies (Q24). It is, however, worthy of note that the second questionnaire reveals another interesting development in the actor network. When the total number of respondents who expressed disagreement and those who selected the "don't know" option is considered, it becomes evident that approximately half of the participants were at risk of abandoning their commitment, as their interest appeared to be no longer aligned with that of the other actors. According to the answers provided by the participants, this phenomenon is not the result of anxiety associated with the necessity of modifying one's familiar work practices to effectively utilize translation tools (Q12) or the perception of lacking comprehensive control over the entirety of the technological implementation process (Q25) or the fatigue induced by the use of such tools (Q32). As illustrated in Figure 6.14, only six participants (P6, P9, P14, P17, P18 and P20) reported feelings of unease regarding changes to their working habits. Furthermore, just five participants (P6, P14, P17, P19 and P20) expressed concerns about the potential for losing control or being required to exert excessive cognitive effort. Interestingly, the number of participants who selected the "don't know" option for all three items ranged between seven and eight. This suggests that, following the training and mentoring phases, translators had acquired the necessary knowledge to express a clear opinion. However, it appears that this trend is only partially attributable to the technical aspects of the process (Figure 4.5), as evidenced by the second interview.

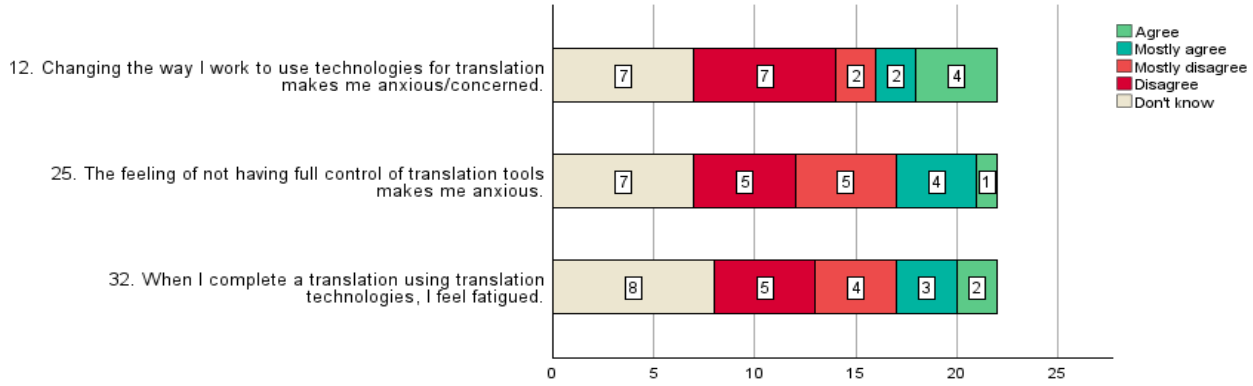


Figure 6.14 Impact of translation technologies on participants' attitude towards technology

The final section of the questionnaire (Figure 6.15) was designed to ascertain whether the use of translation technologies had an effect on participants' approach to their daily activities and, if so,

whether they were able to adapt the tools to their needs, thereby resulting in a source of satisfaction with a positive impact on commitment to further develop their IT skills and knowledge of the new functions. The initial item (Q26) sought to ascertain the potential influence of colleagues on motivation to utilise translation tools. The "don't know" answer was selected by 12 respondents (P1, P3, P4, P11, P12, P13, P15, P16, P18, P20, P21 and P22), while eight (P2, P5, P6, P7, P10, P14, P17 and P19) indicated that the opinion of colleagues was a significant factor in their decision to adopt new technologies. This finding supports the hypothesis put forth by Cresswell (2010) that the nascent actor-network was still in a state of relative instability. Although all participants expressed a certain degree of interest and curiosity regarding the OPP in the initial interview, the commitment to training the NMT engine was insufficient to provide the necessary stability within the network.

From a professional standpoint, only four respondents (P9, P11, P14 and P16) indicated that they were dissatisfied with the utilisation of translation technologies (Q28) and did not alter their work approach (Q31). Conversely, for 15 participants (P1, P2, P3, P4, P5, P7, P8, P10, P12, P13, P17, P18, P19, P21 and P22) completing a translation job using translation tools was a source of satisfaction and, among these participants, 10 (P2, P3, P4, P5, P7, P8, P12, P17, P19 and P21) reported adopting changes in their work to optimally leverage the tools. The need to change working habits was reported as one of disadvantages of introducing MT in workflow (Table 6.2) in the first questionnaire, but it seems it is not a demotivating factor for nearly half of the participants. It is noteworthy that 11 participants (P1, P2, P3, P4, P5, P8, P12, P17, P18, P20 and P21) perceived translators with experience and proficiency in translation technologies to possess a superior professional profile (Q27) and 11 participants (P1, P2, P3, P4, P5, P8, P10, P12, P13, P19 and P21) stated that they were able to adapt translation tools to their work requirements (Q29). This view was counterbalanced by six participants (P9, P10, P11, P14, P15 and P16) who deemed such skills to be irrelevant from a professional standpoint and eight participants (P7, P9, P11, P14, P15, P16, P18 and P20) who lacked the ability to adapt the tools to their needs.

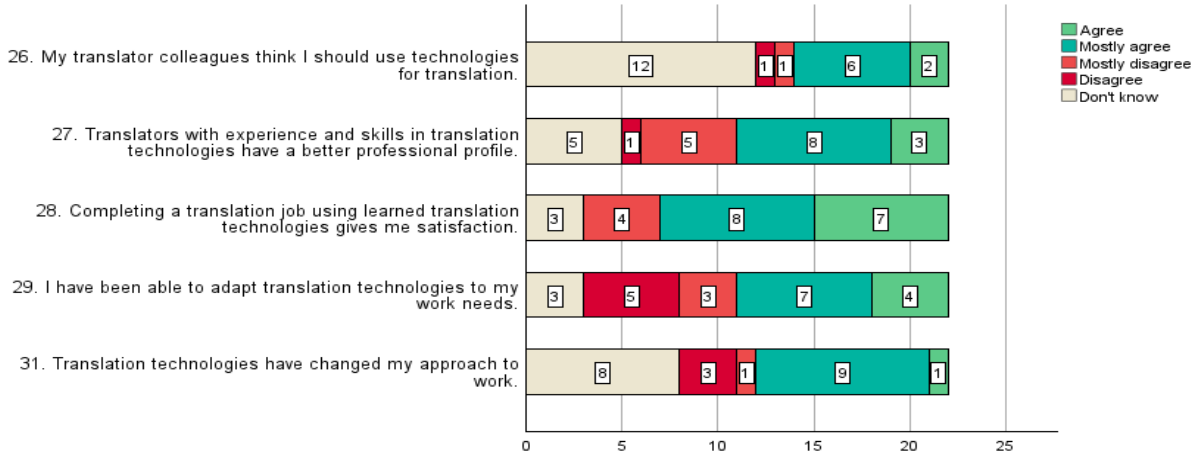


Figure 6.15 Impact of translation technologies on participants' approach to work

The second questionnaire (Figure 4.5) comprised three final open-ended questions dedicated exclusively to MT. Participants were invited to share their opinions about the specific skills required to utilise MT, the optimal utilisation of such technology and the indispensable conditions for its effective deployment. Table 6.4 is a synthetic list of the main skills and the number of participants indicating them to answer the open question Q33:

33. Do you think special skills are needed to use machine translation?	**Number of participants**
speed and logic	4
good terminological and syntactic-grammatical skills	9
just curiosity	4
flexibility and concentration	5
extensive IT skills	4
willingness to change mentality	6
ability to handle MT pitfalls (without being misled)	4
high professionalism and fussiness	3
just time to learn new tools	2
no particular skills	7

Table 6.4 Participants' opinions about the skills needed to use automatic translation

In response to the question concerning the skills required for the use of MT, seven participants (those who decided not to test MT integrated in CAT tool) indicated that no particular skill is necessary, four referenced IT skills or specific knowledge of the MT system employed, and three highlighted linguistic skills and experience. It is noteworthy that five respondents, despite initially identifying a lack of IT skills as a challenge at the outset of the project, highlighted the following factors as crucial for success: willingness to change (P8), new mentality (P2), flexibility (P5), curiosity (P3), and a little time (P18). These findings underscore the pivotal role of personal attitude in the adoption of such technologies, complementing the importance of computer skills that can be developed through training.

The aim of the open-ended question no. 34 (What does 'appropriate use' of machine translation mean to you?) was to verify the opinion of participants after they had the opportunity to experience automatic translation according to the main guidelines adopted by the translation industry (Section 2.2.1). The relevant finding emerging from the answers of participants was the need to find the "right balance between technology and human approach to translation" (P2), having the "appropriate

timeframe" (P17 and P18) to "use MT only as a basis and intervene heavily to correct it" (P22) with "a conscious and vigilant use of the tool" (P4), "without the risk of spreading sensitive data" (P13) and "using machine translation as a support, not a replacement for translation work" (P14). Another crucial point emphasised by participants in this question was "knowing how to adapt technologies to the type of work and also to the type of worker/employee" (P8) as well as to the kind of text to be translated (P1, P3, and P15) that should be formatted correctly and not written in a convoluted legal style. This entails avoiding the pitfall of uncritically accepting MT proposals (P5, P7, P10, P11, P12, and P21) given that the output of NMT is not reliable and exposes users to high levels of risk of incorrect translation, as reported by the participants. P16 proposed that the translation tools should be “lean”, while P6 advocated for their use "moderately". P9, P19 and P20 did not express a stance on this matter.

In the concluding question no. 35 participants were requested to identify the prerequisites for using MT. It is noteworthy that, in addition to the necessity for a meticulous review conducted by an experienced translator in the specific field (P3, P4, P5, P7, P15, and P21), the respondents identified the importance of a trained MT engine (P12 and P15) and the availability of constant support from a technology expert (P9 and P20). It is also worth noting in particular the responses of three participants: the first one focused on "willingness to learn new things, ability to challenge oneself, possibly also willingness to work in a team" (P8 is the only one to talk about team work); the second mentioned "younger than me" (P17); and the third stated that "I would like to say that for me using MT is like playing chess with the computer: sometimes (often) it wins, sometimes I win" (P12). It can be argued that programmes have, in effect, become network actors that stimulate translators to challenge themselves and their skills. In a somewhat unexpected result, given the average level of IT skills demonstrated by the participants, only one individual identified the ease and intuitiveness of the system as a key factor (P10). Nevertheless, approximately half of the respondents emphasised the importance of the characteristics inherent to the source text. The respondents indicated that the source text should be free of complex language, written in a simple and straightforward style, and in a file format that is readable by the translation system without the need for pre-editing or reformatting (P1, P6, P11, P12, P13, P14, P16, P17, and P22). Additionally, P13 and P22 identified the necessity for anonymised text. The formatting issue had a significant impact on the progression of the research project, as will be detailed in the subsequent section.

6.2.4 Fluctuation of the network, betrayal and new stability: the emergence of a subgroup

The formatting issue represented the primary challenge that translators were required to address during the training and mentoring period. In some instances, the inadequate formatting of the file precluded the use of translation tools, necessitating the traditional approach to translation (i.e. manual copying and pasting or rewriting from scratch). All the translators attempted to align the documents after translation in order to store linguistic data in the TMs. However, this required additional time that was not available to them. This resulted in considerable frustration among all the

participants, who felt that they were unable to fully utilise the potential of the tools at their disposal. As a consequence, as documented in my analytical memos, only five translators proceeded with the alignment of a limited number of legacy documents (P1, P3, P4, P5 and P8) that they considered to be of particular relevance. Furthermore, the objective of collecting one million words for the first MT training appeared to be unattainable. They tested the importance of working with a customised engine, and at least half of the participants demonstrated a commitment to this objective. Six participants, however, were discouraged by these difficulties and began to doubt the feasibility of the goal, leading to a divergence of interests from the other half of the network. The inscription agreed by all actors to reach irreversibility and the immutable mobile (i.e. full integration of translation technologies in the department) was the creation of TMs and a common repository of linguistic data. Furthermore, I assumed the role of a delegate, tasked with representing this issue to the other departments and developing a viable solution in collaboration with them. The solution, unfortunately, was not readily apparent, given that a portion of the documents were internal to the Ministry of Justice, while the majority originated from other Ministries and entities abroad, each with its own unique formatting and characteristics. The IT department proposed the acquisition of a more powerful OCR system, while the Head of Department suggested the standardisation of the formatting, at least for internal documentation. The unexpected change to the Head of Department constituted a further source of instability for the actor network, given that the subsequent period of interim assignments (approximately three months between Phase II and Phase III) served to exacerbate this instability further.

The second interview (Section 7.3) conducted at the conclusion of this phase served to investigate the impact of technical issues and the replacement of one actor (i.e. the change in the Head of Department) on the balance of the actor network, necessitating a form of "re-negotiation" in the commitment of the actors to pursue the objective of training the engine. The delay in the acquisition of an OCR system (the request was pending alongside other requests awaiting the approval of the new Head of Department) and the uncertainty regarding the potential for further development of the research project had a significant impact on the motivation of participants. The questions of the interview focused on the effectiveness of translation technologies in their daily work, the reasons for using or not using translation tools, as well as their suggestions and expectations. In particular, apart from one translator who stated that MT or CAT tools were not the panacea and another who expressed reluctance to reuse translation solutions created by another colleague, seven translators (P6, P7, P11, P13, P14, P15, and P16) confirmed their interest in the project but stated that they were unable to utilise the translation tools to their fullest potential due to the formatting-related issues. As a result, they were unable to assess the benefits of a TM enhanced with their personal translations and experienced a sense of discouragement due to the inability to appreciate immediate outcomes, particularly given the unattainability of the ultimate objective of a purpose-built NMT. Nevertheless, they all asserted their intention to commence more extensive utilisation of the

translation tools once the technical issues had been resolved. From an ANT perspective, this could be interpreted as a kind of betrayal from one of the actors (the Head of Department) that had a snowball effect on other actors of the network, resulting in a temporary suspension of some participants commitment. This situation also had an impact on the non-human actors, as they failed to meet the expectations of the translators. Rather than accelerating their routine activities and assisting with repetitive texts and formatting issues, non-human actors demanded an additional workload for the pre-editing of files and the alignment of translated documents to create TMs. Despite being aware that an initial investment of time was necessary to gain future benefits, the uncertainty surrounding the three months transition period before the start of Phase III had a detrimental effect on some participants.

In contrast, the nine participants who invested time in pre-editing the formatting and alignment activities were able to appreciate the advantages of the emerging actor network. Translation tools facilitated the translation of repetitive text, leveraged previously translated documents, ensured terminology consistency, and saved time by avoiding the need to search for terms that had already been translated, thanks to the creation of TBs. Participants P1, P3, P4, P5, P8, P9, P12, P19 and P22 emphasised the potential for capitalising on the language choices and terminology employed by themselves and their colleagues, as well as the possibility of achieving higher quality and greater speed in translation. Participants P3, P4, P5, P8, P9 and P12 also highlighted the potential for improving the organisational aspect of the team. Furthermore, the potential for an enhancement in interpersonal dynamics with colleagues was identified, with two participants (P3 and P8) additionally noting the possibility of overcoming psychological resistance for some individuals. These six participants also reported in the interview that the adoption of translation technologies, in addition to their technical aspects, has fostered collaboration between colleagues. However, participants P3, P4, P5, P8, P9 and P12 posited that greater collaboration, personal attitude towards new technologies and planning (e.g. creating common guidelines for managing and storing translations; sharing TMs and TBs; sharing linguistic experience etc.) were necessary, as these were perceived to be currently lacking (as reported in the interviews and in the analytic memos too).

The project's promoters, with the support of other actors, emphasised the necessity of reinforcing the commitment of the non-translator actors in order to maintain the project's viability while awaiting the appointment of a new Head of Department and informing him/her of the project's progress and outcomes. They highlighted that the impact of translation technologies was pervasive and that collaboration with other administrations could prove advantageous for the enrichment of the linguistic dataset for MT training. In light of the evolving circumstances, it became evident that a novel intermediate OPP was required, capitalising on the potential of the bottom-up approach in order to facilitate the realisation of the initial plan. Given that some participants were not actively contributing to the enrichment of TMs and part of the documents required too much effort to be processed with translation tools, I decided to engage five students from the university as trainees. Their role was to

perform the alignment of open-source documentation and collect the necessary data to train the engine. The utilisation of open-source documentation presented two advantages: firstly, it avoided the issue of pseudonymisation and, secondly, it protected internal confidential data. The other actors appointed me as their spokesperson in order to act as a mediator with the IT department, which facilitated our efforts to secure the approval of the Deputy Head of Department and subsequently that of the Head of Cabinet for the traineeship proposal (Figure 4.2).

The necessity to establish new alliances in the shared interest of further deployment of translation technologies, notwithstanding the difficulties, discouraged some actors who did not consider the realisation of the project feasible. Conversely, it reinforced the commitment of other actors, as well as the interpersonal relationships among actors who had never worked together due to the physical dislocation in two different offices. The union of 12 participants who remained committed to the initial agreement between Group A and Group B resulted in the formation of the sub-group that had the opportunity to test the trained MT engines, exploring the potential benefits of augmented translation, specifically the combined use of TMs, TBs, and NMT.

6.3 Phase III: deployment of customised NMT engine and conclusion of the research project

While 12 participants were gradually developing their confidence in the use of translation tools, I limited my involvement to providing occasional assistance and guidance via email or telephone, with the aim of fostering their autonomy. Meanwhile, they aided me in the guidance of the trainees in the preparation of linguistic data and the customisation of the engines. Unfortunately, due to time limitations, the combined TMs created by the participants and the TMs produced by the trainees with the alignment of translated documents reached a total of one million words only for the linguistic combinations English - Italian and Italian - English. In the case of French, German and Spanish, the TMs were insufficient in size to yield a meaningful enhancement of the MT engine. Further details about the technical and linguistic aspects of the customised engines are provided in Chapter 5. Regarding the technical aspects related to the use of translation technologies, the last questionnaires confirmed some trends observed in the second one (Figure 6.16).

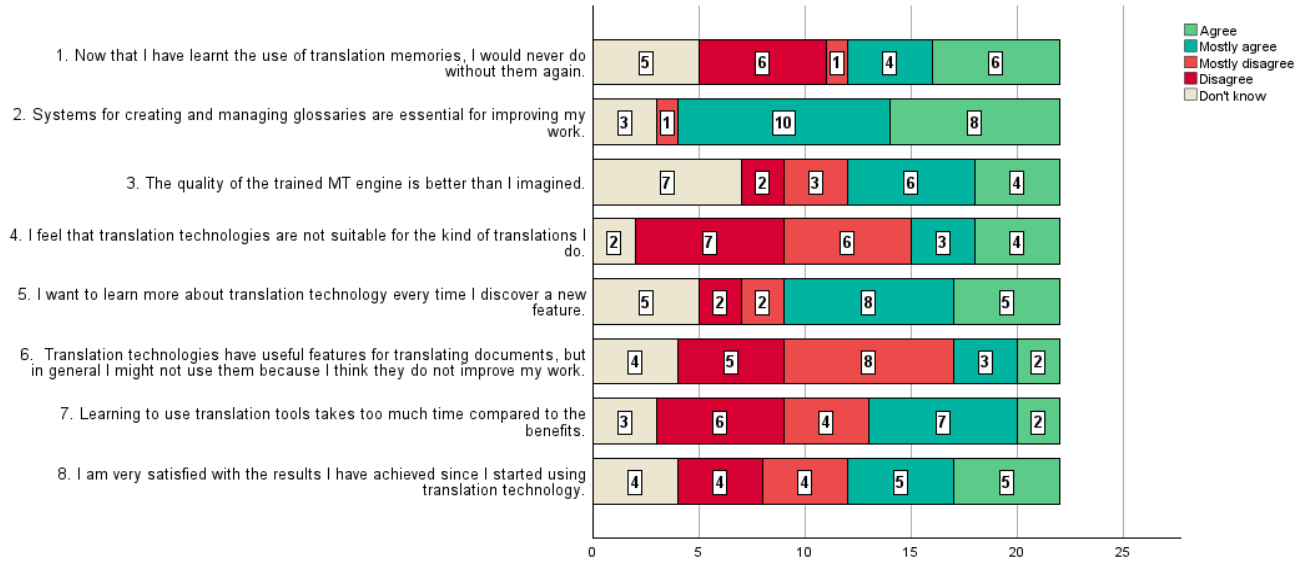


Figure 6.16 Participants' opinions (Group A and B) about translation technologies at the end of the research project

It is interesting to note that TMs were identified as essential by 10 participants (P1, P2, P3, P4, P5, P8, P9, P10, P12, and P21) (Q1), while TBs were deemed essential by 18 respondents (Q2), only P13 mostly disagreed and P7, P14 and P16 opted for the "don't know" answer. This finding reflects one of the primary issues associated with the use of MT in conjunction with legal translation, namely the accuracy and consistency of terminology. Terminology management in MT output represents a crucial area for further investigation, with a particular focus on the potential of AI plug-in, which is now available in the latest version of Trados Studio 2024[9]. Nevertheless, this did not represent a source of demotivation thanks to the possibility of controlling MT terminological pitfalls with TBs integrated in the work environment of the CAT tool. Furthermore, 13 participants (P1, P2, P3, P4, P5, P7, P8, P9, P12, P17, P18, P21, P22) expressed a desire to learn more about translation technologies (Q5) because discovering new features of translation tools that could be useful in their daily activities was a source of motivation for them. As previously observed in the second interview (see also Section 7.3), a subset of five participants who declined to adopt translation tools in their daily activities during Phase II were not inherently opposed, but rather were awaiting more favourable circumstances for their utilisation. The nature of the translations to be completed by seven participants (P6, P7, P11, P13, P14, P15, and P16) rendered translation tools unsuitable for the task (Q4), and consequently did not enhance the work of five respondents (P7, P14, P15, P16, and P20), despite the beneficial functions they offered (Q6). The responses to Q16 ("The problems with converting PDF files demotivated me and I decided not to use translation technology") confirmed that difficulties encountered when converting PDF files discouraged nine participants (P2, P6, P7, P12, P13, P14, P16, P17, and P20), and among these six (P6, P7, P13, P14, P15, and P16) decided to go on testing translation technologies when they had some time without implementing them in

[9] https://appstore.rws.com/Plugin/200 (consulted on 25 October 2024)

their daily tasks. Overall, 10 respondents (P1, P2, P3, P4, P5, P8, P9, P12, P21, and P22) indicated that the time invested in learning translation tools was not excessive in comparison to the perceived benefits (Q7). This finding almost confirms the results of the second questionnaire (Q22, Figure 6.13). The trend of the combined impact of the mentoring phase and motivation to use translation tools observed in Phase II seems to be confirmed in Phase III. Furthermore, almost the same 10 participants (P1, P2, P3, P4, P5, P8, P9, P10, P12, and P21) expressed satisfaction with the results achieved since they began utilising translation technologies (Q8). It is regrettable that Q3 concerning the quality of trained NMT could not be regarded as a genuine outcome (10 participants rated the output of the trained NMT as better than expected), given that only a subset of translators (those working with the English-Italian language combination) had the chance to assess the engine, which had been customised with the minimum recommended number of words. It is significant to note that the seven participants who selected the "don't know" option (P6, P7, P9, P13, P18, P20, and P22) were not able to evaluate at least the English - Italian or Italian - English trained engine.

As illustrated in Figure 6.17, the integrated use of TMs, TBs and NMT in accordance with the augmented translation principles was deemed beneficial by 15 participants (P1, P3, P4, P5, P6, P8, P9, P10, P12, P17, P18, P19, P20, P21, and P22) (Q9) and 12 respondents (P2, P3, P4, P5, P6, P8, P9, P12, P17, P19, P21, and P22) considered it advantageous to detect potential translation errors that might be masked by the fluent style of the engine output (Q10).

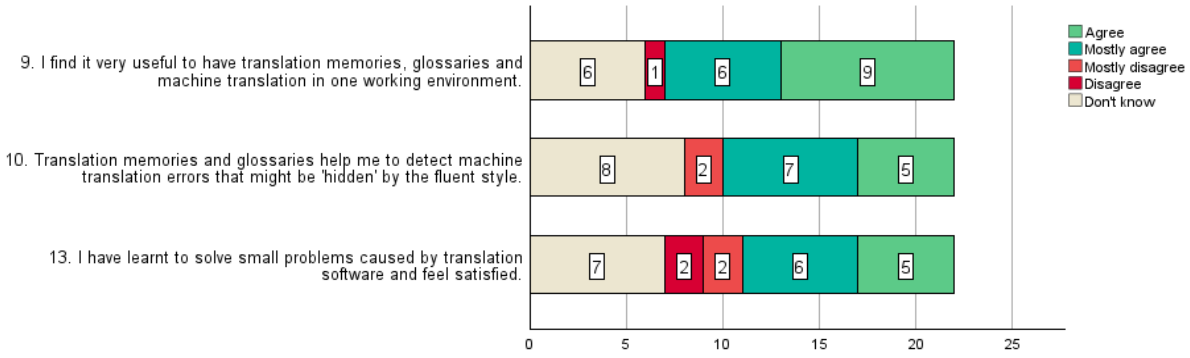


Figure 6.17 Participants' opinions about integrated use of TMs, TBs and NMT in one environment

It is noteworthy that 11 participants (P1, P2, P3, P4, P5, P8, P9, P10, P12, P17, and P21) expressed satisfaction with their ability to resolve minor issues arising from the utilisation of translation tools (Q13), an expected outcome towards confidence and autonomy of translators in technologically assisted environments considering that seven out of the 11 translators that disagreed or opted for the “don’t know” answer were those who decided not to use translation tools in their daily activities.

With regard to the impact of translation technologies on interpersonal relationships and collaboration, the results of the final questionnaire indicated a shift in the attitudes of a number of participants (Figure 6.18). In Q18, 13 respondents (P1, P2, P3, P4, P5, P6, P9, P12, P17, P18, P19, P21, and P22) indicated that sharing TMs and TBs with colleagues was beneficial. Additionally, 18 participants

asserted that teamwork is crucial for achieving enhanced results in a time-efficient manner when using translation technologies (Q19), while P6, P11, P15 and P16 opted for the “don’t know” answer. In comparison to the findings of the preceding questionnaire, this represented a radical shift in the participants' stance on collaborative work. However, it is noteworthy that four respondents (P6, P13, P14 and P16) asserted that sharing TMs and TBs was not beneficial for their specific translation work (Q20).

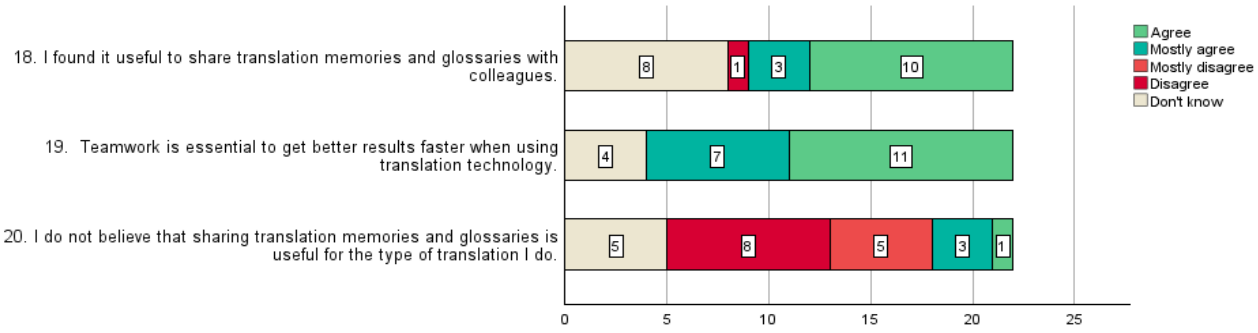


Figure 6.18 Participants' opinions about linguistic data sharing and teamwork

Upon completion of the research project (Figure 6.19), 11 participants indicated that they felt a sense of contribution to the project's success (Section 3.5). This was attributed to their professional experience and personal commitment (Q23), as a consequence of the participatory approach and the expression of a kind of decision-making. Additionally, 10 respondents reported that sharing the project's challenges and achievements with colleagues served as a motivating factor for them (Q29). Nevertheless, the majority of respondents (13 participants) asserted that the opinion of colleagues did not influence their decision to utilise or refrain from utilising translation technologies. Furthermore, 12 translators perceived themselves to be consistently autonomous in their professional decisions (Q12). In contrast, the six respondents who opted not to utilise translation technologies indicated that they believed such tools would compromise their autonomy.

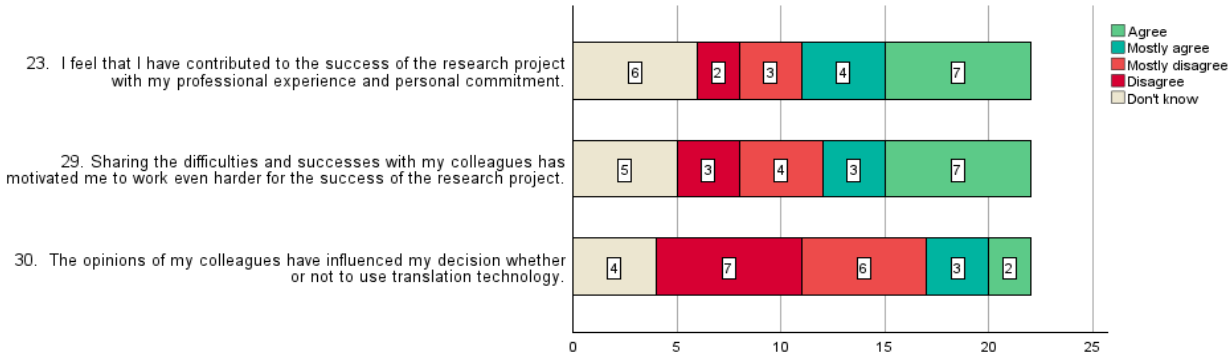


Figure 6.19 Participants' opinions about social perspective of research project

In the final interview, the significance of collaboration and teamwork was further emphasised as a crucial and advantageous aspect of organisational change facilitated by translation technologies. In particular, in the question no. 1 "If you were asked to explain to someone outside the Ministry of

Justice how translation technology has changed your work, what would you choose to talk about?" the participants highlighted some aspects that are relevant to answer the RQs:

1.2 What is the impact of non-human actors on the internal network of participants from an ANT perspective?

1.3 What is the impact of a participatory/bottom-up approach on the adoption of translation technologies?

In the third interview, one of the main topic discussed by some participants was the novel approach to work, with P2 emphasizing the objective of "facilitating a more comprehensive dissemination of the insights and expertise accumulated by myself and my colleagues". P5 posited that this novel approach necessitated a "shift in perspective, moving away from an exclusive focus on personal style and towards a collective one, with the aim of benefiting the entire group". The value of teamwork was emphasised by participants. P3 stated that "the experience of working in a group and rethinking and sharing some translation choices with my colleagues was highly rewarding", while P5 added that "the possibility of constantly verifying the consistency of personal and individual choices with those made by other colleagues was a particularly valuable aspect of this process". Nine participants out of 22 focused also on "the importance of teamwork in developing a reliable translation engine suitable for the specific types of documents being translated for the Ministry of Justice" (mentioning the words of P4) and the "noteworthy benefit of sharing terminology choices in real time with all colleagues through the use of concordance search just pressing the F3 key" reported by P5. Participant P17 emphasised also "the potential for a symbiotic relationship between the human brain and computer technology. This could lead to a reduction in the monotony of daily work tasks, such as the translation and editing of forms that have been a standard practice for years". The necessity for innovation and the considerable potential demonstrated by translation technologies, even in the legal sector, despite its linguistic and stylistic peculiarities, was also highlighted by P22, who stated that "at the Ministry, we have been utilising the same system since 1995. Upon joining the organisation, I was immediately tasked with translating using the outdated system. It became evident that the Ministry was not aware of the advancements occurring in the wider world until the introduction of the new translation technologies thanks to your research project". Additionally, five out of the 12 participants who decided to go on with the use of translation technologies beyond the conclusion of the research project, expressed reservations about the project and its effective impact because they felt it had fallen short of expectations. In particular, P8 stated that "it would have been even more useful if a greater number of individuals had been involved". Conversely, the participants who decided not to use translation tools in their daily tasks, provided a different perspective of the research project. In particular, P13 revealed one of the limitations of the approach adopted in this project to introduce translation tools: "I don't know because it seems a bit far-fetched to say that they changed our work since it was a presentation of a new method, an experiment, something we were

given the opportunity to learn about. But to say they changed it, I don't know. They changed it perhaps for some of us, so they changed it in the sense that now some colleagues work with this method and others continue to work with the previous method". Having the opportunity not to use translation tools, after the training and mentoring P11 chose not use technologies because "in my experience, it has not yielded any beneficial or constructive outcomes".

In a later question, I inquired about one positive and one negative aspect of the research project related to the introduction of translation technologies. Table 6.5 presents a summary of the principal topics that emerged in response to the question:

Positive	**Negative**
the concept of collectivity was previously absent, yet it has now emerged as a potential unifying force among a select few	issues related to file format and time required for PDF conversion and pre-editing
teamwork and professional growth for the translator, without compromising autonomy	a novel approach to work that required a rethink, a process that requires time and patience to yield results, though these may not be immediately apparent
sharing linguistic resources, problems and solutions (it was not always so obvious before)	the TMs and TBs could not be shared with everyone because of strong resistance, so this was a missed opportunity
created a team spirit and a desire to work together in those who supported the new proposal	translation technologies created a climate of pro and against in the office, and participants decided not to talk about it to avoid confrontation
speeding up translation activity avoiding repetitive parts	a new translation method that is too complex, not very intuitive
cohesion created within a small group and the challenge of trying to change something	failing to raise awareness among managers or to make progress in file format management

Table 6.5 Positive and negative aspects of the research project according to participants

The overarching concept that emerged once again was that of a new team spirit, collaboration and teamwork. These were essential for translation technologies that required not only the sharing of linguistic resources and competence, but also problems and solutions. It had the potential to act as "a unifying force" according to P4, and P5 stated that this “was not always so obvious before”. Analysing the answers reported in Table 6.6, it provided an opportunity for professional growth for the translators, “without compromising autonomy and the challenge of trying to change something, (let's see what happens)" as stated by P17. According to P12, this was valid only for "those who joined the new proposal" and decided to take part in the intervention till the end. In this last interview a clear dichotomy emerged between those who were in favour and those who were against translation technologies. Participant P9 reported that the "resistance" of some of the translators to use translation tools and share TMs and TBs could potentially give rise to tensions with other

colleagues, "even with people I care about, respect and love, I find myself having to disagree with their opinions. So, I choose not to talk about it to avoid confrontation". This disposition of respecting the stances of colleagues, without exerting pressure or being influenced by them, was also observed in the questionnaire (see Q30 above).

Despite the confirmation by 15 participants that translation tools speeded up work by avoiding the translation of repetitive parts, the issues related to file format and the time required for PDF conversion and pre-editing were identified by all the participants as negative aspects that remained unresolved. Another disadvantage for P2 was that the "novel approach to work required a rethink, [...] a process that requires time and patience" as the time invested did not yield immediate results. The integration of translation technologies required the participants to "reconsider their methodology and approach to work" (P2). Unfortunately, the new translation method proved to be "too complex, not very intuitive" for P11 and all the other participants who decided not to implement translation tools in daily tasks.

In the concluding question of the interview, participants were invited to describe their experience with translation technologies using only three adjectives. The adjectives most frequently mentioned were "stimulating", "useful" (in both a human and professional capacity) and "challenging". Furthermore, the terms "aggregating" and "participative" were frequently referenced by 15 participants, who attested to having engaged in a novel system of work that they had not previously experienced. Prior to the use of translation technologies, they self-identified as "islands" or "monads," despite having collaborated on projects 10 years prior. Following the department's disaggregation, communication ceased, resulting in a phenomenon whereby "the same things were said differently," as observed by P22. Some participants expressed surprise at the experience, but many also described it as disappointing and frustrating, noting that while there was considerable potential, it was not possible to fully realise it.

The responses of two participants were noteworthy for their capacity to articulate the impact of the project on them. The first one (P3) defined the experience stressful at first because she recalled "the sense of fear; deciding to use this system was like going out to sea without knowing if there was actually someone there, if there was an engine that would bring you back on board, that would bring you back to land". The second one (P13) defined the project "potentially misleading for those who look at our work from the outside and are led to draw conclusions to the effect that everything is done better, faster with this system. Misleading the very concept of speed […] applied to this kind of translation". Indeed, on several occasions throughout the whole duration of the project, 16 participants in various moments (as reported in analytic memos and not only in interviews and questionnaires) articulated a concern that the potential of these tools might be misperceived by managers, who, as translation laypersons, could not fully comprehend the complexities involved in integrating translation tools into legal translation.

6.4 Concluding remarks

In view of the results of this study, the decision to use the characteristics of the working environment to define the two groups and the three phases of the research proved to be the most effective, because it was flexible and adaptable to the unpredictable events that the researcher had to face during the development of the intervention. In fact, in the first phase, some actors who were only interested in some aspects of the intervention went far beyond their initial commitment and had a significant impact on the development of the network. In fact, the IT experts went beyond technical support and acted as intermediaries with the head of department; a second department unexpectedly joined the intervention; and the support of an external IT consultant to the head of department proved crucial. In the second phase, the promising results of the use of translation memories and the positive influence of the head of department had a greater impact than expected on the participation of the members of the second group. In the third phase, the impossibility of solving some technical problems related to file formats and the sudden substitution of the head of department completely changed the relations within the group by encouraging the creation of a new group. This confirmed the idea expressed by Mitchell and Nault (2003) that many of the problems encountered in implementing new technologies in organisational settings arise from the interaction of social and technical factors.

In this perspective, agency is not inherent to the actors (human or non-human) themselves but arises from the way they interact with each other in the network. Indeed, the formation of new alliances, which led to the creation of a new working group towards the end of the intervention, and the increasing reluctance on the part of some participants, showed that the motivation and satisfaction of the participants are key elements in favour of or against the technological shift (as will be discussed in Chapter 7). At the same time, the combination of individual motivation, new opportunities offered by translation technology and organisational changes in the management of the department confirms the assumption that actions do not only originate from individual actors, but also from the combination of other technical and social factors arising in the working environment.

An analysis of the sequence of events that led to shifts or setbacks in the process of transformation and network development provided insights into the role of translators' agency in the implementation of new working habits. This was achieved by adopting a bottom-up approach, starting from their needs. Furthermore, an analysis conducted through the lens of some key ANT concepts, such as actors and agency, problematisation, enrolment, mobilisation, inscription and betrayal, proved beneficial in evaluating the unexpected results of an emerging micro-network (comprising human and non-human actors) created within the macro-network of the Ministry and identify further elements for future research.

It is also important to note that artifacts imposed their agency according to the interest attributed by the other actors and if they did not provide the expected results, this was identified as a betrayal:

translation tools were not able to manage file formats as expected (first betrayal); the head of department did not provide the new OCR program to ensure that the translation tools functioned properly (second betrayal); the translators were sceptical about the program's potential and consequently assumed the role of observers, rather than that of actors (third betrayal).

It is also crucial to consider the role of the researcher within the evolving actor network that has been established throughout the course of this project. The challenges identified by Risku et al. (2020) were evident in this research, along with an additional issue outlined by Fine (1993): "[s]ometimes in the course of research, we become sympathetic to the aims of the group" (p. 271). Maintaining a professional and neutral approach towards all participants proved to be a significant challenge for me. One group expressed support for the technological change, while the other was influenced by factors including the head of department, professional curiosity, or colleagues. However, these disparate motivations proved advantageous for the study, which concentrated on factors of motivation and attitude. The opportunity to work side by side with each participant also afforded the chance to gain valuable insights into the same elements related to the observed workflow, although this did necessitate a different training approach with each individual. However, despite the initial impression of stability and meticulous planning, the change in department leadership had a notable impact on the equilibrium and level of participation that had previously been established. In these circumstances, the application of ANT proved an effective framework for analysing the evolving interpersonal dynamics. As evidenced in the research findings, towards the conclusion of the project, the necessity for collaboration among participants increased due to the operationalisation of novel technologies. This resulted in the formation of a third group, driven by the demonstrated advantages of translation technologies and a desire to attain even greater results.

During the period of transition from the previous head of department to the incoming one, the development of personal relationships and the establishment of trust with participants and personnel from other departments, including the IT department and the deputy head of department, proved to be of great importance. These relationships and the mutual trust built with them enabled the research to continue as planned and facilitated the negotiation of an agreement with the university to involve five trainees in the preparation of the linguistic data. The preliminary meeting between trainees, office managers and linguists was held with the objective of devising a strategy for the collection and preparation of linguistic data for the purpose of NMT training. This marked the first occasion on which the participants who were to constitute the third group, together with those who were not opposed to translation technologies but wished to participate as observers, were clearly defined. In the final phase of the study, as the deadline for the free use of research tools approached, the recently constituted third group, led by their head of office, directly involved me in organising a bottom-up initiative. The group proposed to the newly appointed head of department to purchase tool licenses.

Chapter 7 Technology impact on satisfaction, and motivation. The role of attitude and training

7 Introduction

As discussed in Chapter 6, the ANT framework proved an appropriate means of offering insights into the ways in which the introduction of translation tools influenced actor-network dynamics and evolution. Furthermore, the analysis of the actor network's reaction to external events that affected internal stability revealed various episodes that resulted in the betrayal of some actors. These events also demonstrated the network's capacity to realign and redistribute roles. The 22 participants who had been enrolled from Groups A and B continued to participate until the contraction of the network to 12 participants from Groups A and B, whose interests remained aligned throughout the entire translation^{ANT} process, reaching the point of stability and the irreversibility with the acquisition of licences. ANT provided the social perspective of the event, facilitating an analysis of the ways in which the interpersonal relationships that, at the outset, were perceived as an irrelevant or non-essential element of the work environment, have become a source of satisfaction and motivation. This chapter analyses the individual perspective using reflexive TA, presenting the results of the questionnaires and interviews in depth to investigate sources of satisfaction and motivation as well as attitude towards translation technologies examined from the perspective of reflexive TA, using the codes and themes created according to the approach proposed by Braun and Clarke (2019a).

7.1 The six phases of reflexive TA: creation of codes and themes

Applying the recursive approach described in Section 4.10, the data of the present study were coded following Braun and Clarke's updated version of a six-stage process of reflexive TA (2020a), as shown in Figure 7.1: (1) data familiarisation and writing familiarisation notes; (2) systematic data coding; (3) generating initial themes from coded and collated data; (4) developing and reviewing themes; (5) refining, defining and naming themes; and (6) writing the report.

Figure 7.1 Six-stage reflective TA (from Braun and Clarke, 2020a)

The initial deductive coding was informed according to the indicators identifying selected ANT concepts (section 3.3.4), Rodríguez-Castro's multifaceted approach to satisfaction (section 3.4.1), Herzberg's two-factor theory related to motivation (section 3.5), and Rossi and Chevrot's principles related to attitude towards technological innovation in the institutional environment (section 3.6).

Stage 1: data familiarisation and writing familiarisation notes

The analysis of questionnaire data using SPSS and the analysis of interview data using NVIVO enabled me to familiarise myself with the data set. Questionnaires and interviews were prepared and

administered in Italian. To avoid introducing bias due to terminological nuances during translation, the data was initially collected, then analysed and coded a first time in Italian, and subsequently I translated them into English for inclusion in this thesis. The translation phase proved useful because it required a careful linguistic analysis of the source text to identify the appropriate terminology and maintain all the connotations of the original meaning. The great flexibility of reflexive TA proved to be a considerable advantage for the present research, as it could be applied to quantitative data collected through questionnaires in order to identify relationships between the data and field observations, to find patterns in and gain insight into the data, in order to discover elements that might not otherwise be apparent. In particular, the data from the questionnaires were used to identify a first central organising concept, a domain summary, which is a summary of all the ideas expressed by the participants in relation to an area under investigation (e.g. a specific topic or interview question), to be used as a starting point to capture and summarise a meaningful pattern in the data and to identify the themes. A domain summary is used simply to summarise participants' responses on a particular topic, without identifying any common or shared meaning. A theme, on the other hand, refers to a set of data points that share a coherent idea and meaning. Table 7.1 summarises the first domains and related concepts identified in this preliminary phase: (personal) relationships,[10] satisfaction, motivation, attitude, frustration and resistance (the colours in the table were used to help identify the different domains in questionnaires to facilitate the analysis also from a visual point of view). The third column of Table 7.1 shows some memos I jotted down to keep track of some of my observations during the mentoring phase (Phase II).

Domain	Concepts expressed by participants	Notes
Relationships	interaction with COLLEAGUES	(involvement in research)
	interaction with HEAD	(buying PCs/OCR/licenses)
	interaction with CAT/NMT (new actor)	
	interaction with RESEARCHER (new actor)	(mentoring)
	interaction with TRAINEES (new actor)	
Satisfaction	personal relationships	
	Agency	
	linguistic authority	
	professional aspects	
	Autonomy	
	organisational processes	
	Technologies	(tools to perform job)
Motivation	professional growth	(training, new skills)
	collaboration with colleagues	
	avoid repetitive tasks	
	speeding up job	
	participatory approach	(commitment)
	job/personal challenge	

[10] This domain is ANT inspired and represents the social perspective of the study

	participants' needs	(working conditions)
Attitude	IT/CAT/NMT perception	
	IT/CAT/NMT fear	
	user experience	
	working dynamics	
	self-perception/profession	
Frustration	future of technology in Ministry of Justice	
	technical issues	(file format, old PC)
	effort required to create TMs and TBs	
	lack of time	
	complicated tools	
Resistance	risks associated with the use of technologies	
	sharing knowledge and glossaries	
	no trust in technologies	(misconception)
	prefer to work alone	(uneasiness)
	prefer occasional use of generic NMT	(changes in working habits)

Table 7.1 Domains identified in preliminary data analysis stage

Stage 2: systematic data coding

In a first step (which could be defined as the top-down phase of data analysis), the focus concepts of the theories on which the questionnaires were built (see section 4.8.1) were transformed into the initial set of codes in the first round of data analysis, providing a kind of compass that was useful in keeping the focus on the RQs (Section 1.3). I used the software NVIVO 14 (Figure 7.2) to perform the coding of the interviews, sometimes assigning the same excerpt to more than one code, incorporating the analytical memos where necessary to keep track of any particular aspect I noted during the mentoring phase and the one-to-one meetings (Figure 4.4).

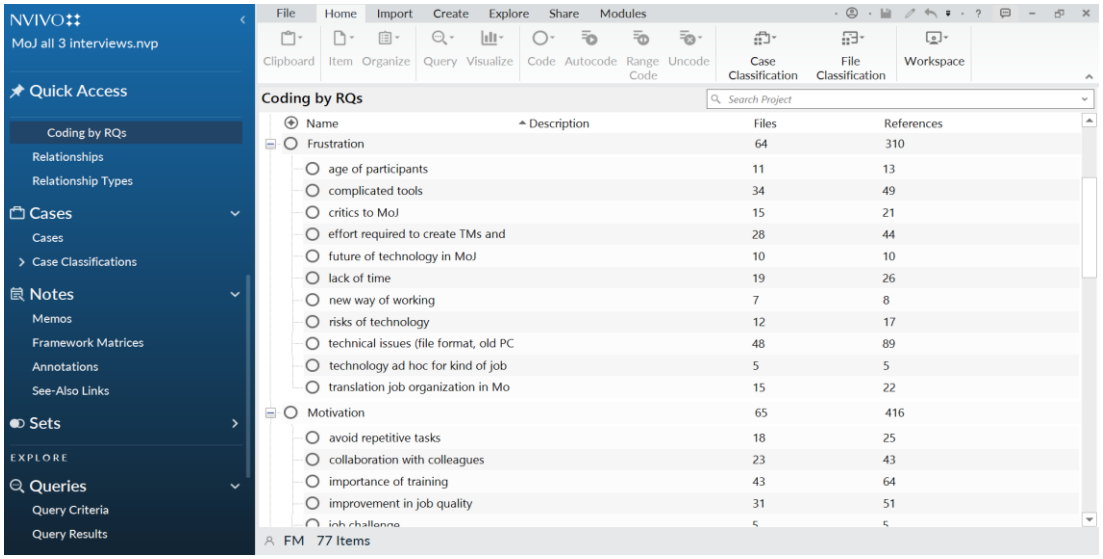


Figure 7.2 NVIVO screenshot: creation of theme and codes

Stage 3: generating initial themes from coded and collated data

In a second stage, the first set of qualitative codes generated in the analysis of the questionnaires was used to verify themes and patterns in the data collected in the interviews. In consideration of the RQs, the initial themes were oriented towards the subjects of satisfaction, motivation and attitude. Nevertheless, achieving equilibrium between depth and breadth with respect to the multifaceted aspects of the independent variables (including, for example, agency, autonomy and linguistic authority) proved challenging (Figure 7.3). Consequently, it was not straightforward to attribute each specific code to a single theme. In some instances, the same code was applicable to two themes.

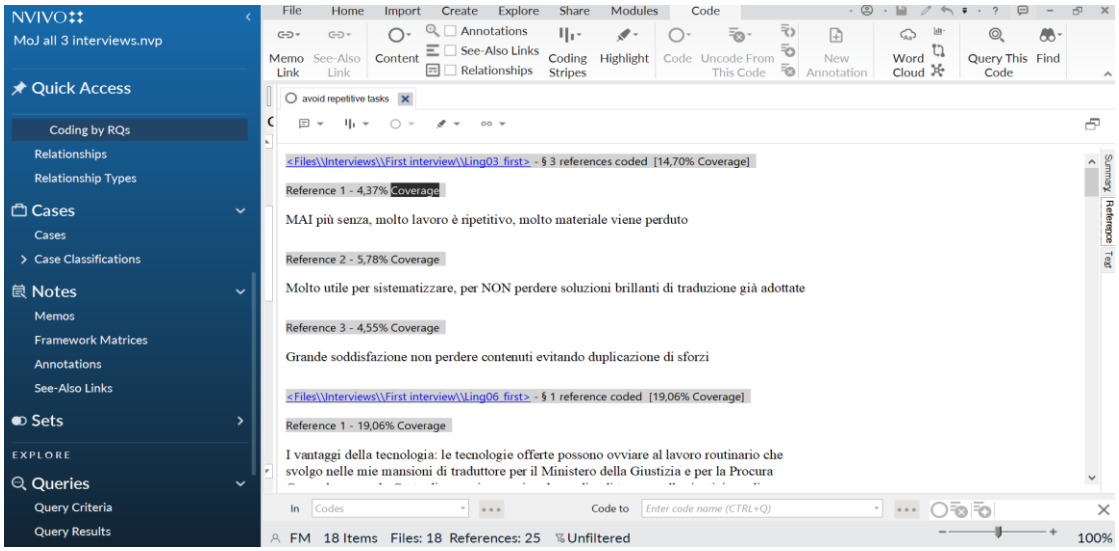


Figure 7.3 NVIVO screenshot: coding chunks of text

Stage 4: developing and reviewing themes

In the next stage of the data analysis process (which could be defined as the bottom-up^{COD} phase of data analysis), a new round of coding was conducted on the data collected through interviews. This was done in order to allow new potential themes to emerge from the direct voice of the participants and to capture their perspectives. At this stage, approximately 70 different codes were produced, which provided a very detailed analysis, but at the same time they were excessively fine-grained, so in the following round of coding, they were narrowed down (Figure 7.4).

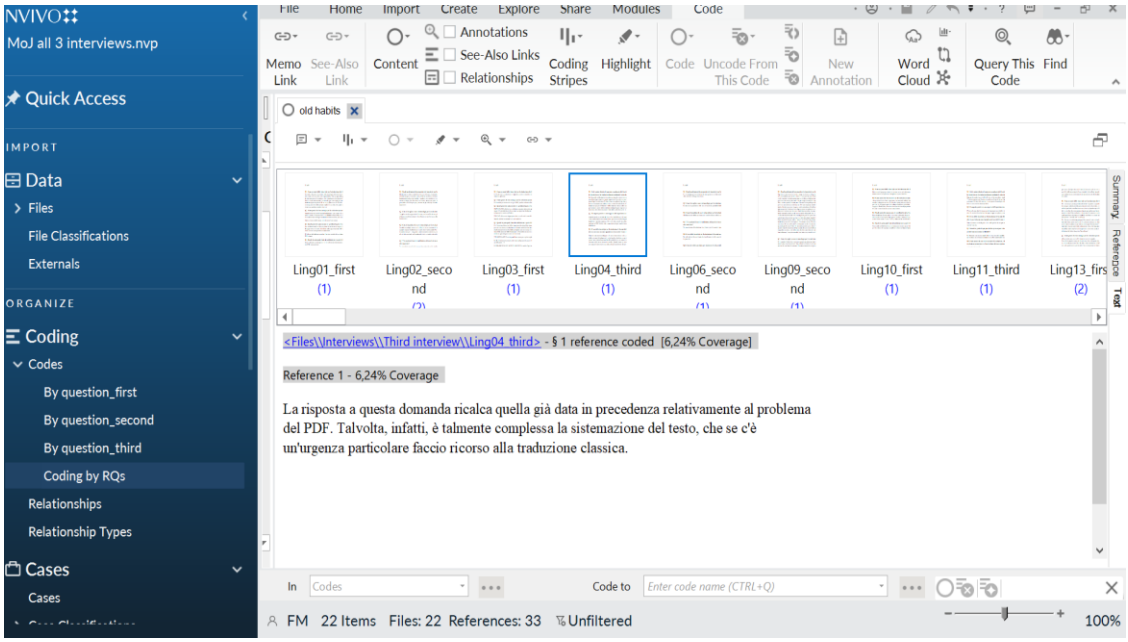


Figure 7.4 NVIVO screenshot: retrieving full single interviews to refine themes and codes

Stage 5: refining, defining and naming themes

In the following stage, the newly emerging codes were compared with the initial codes to define and refine the codes and generate the final themes needed to answer the RQs. This cycle was repeated for each of the three phases of the project (Section 4.7), and the end of the fieldwork on all data collected across the three phases in order to gain a longitudinal and comprehensive understanding of the results. The objective of this method was to obtain a multifaceted perspective on the same factor under investigation, ensuring balance between the interpretation of the researcher and the opinions of the participants.

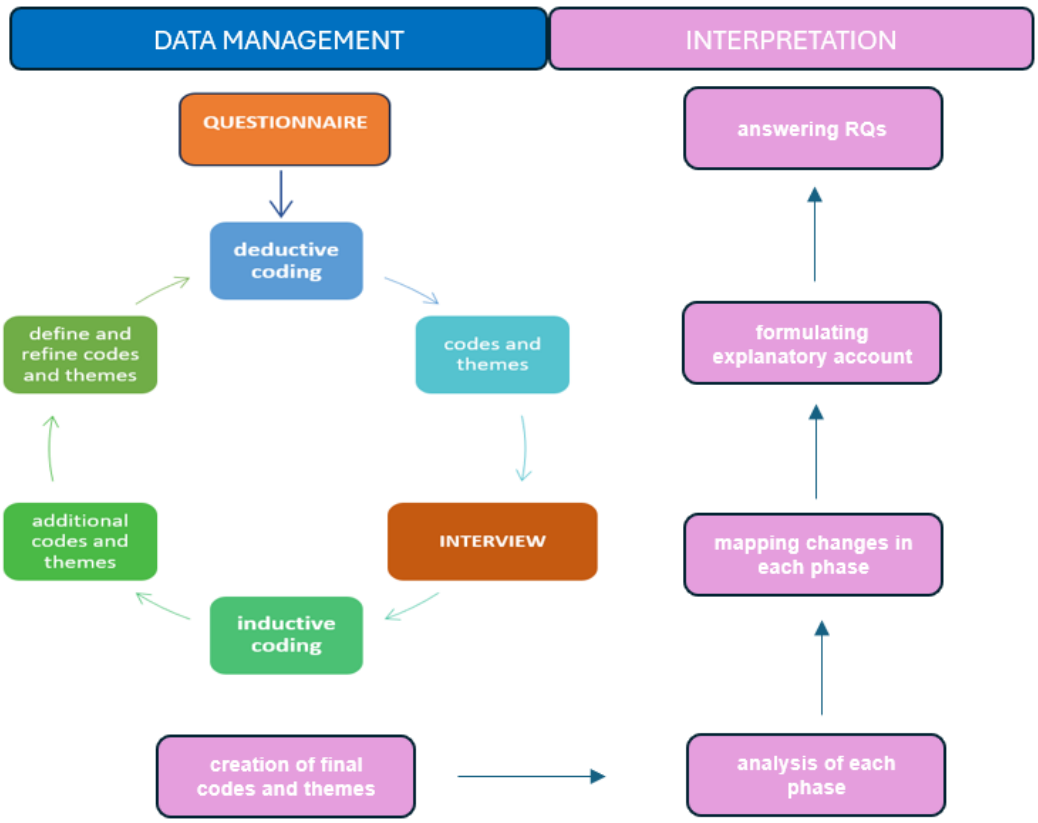


Figure 7.5 Process for the creation of themes and codes in the present study

At the end of the whole process (Figure 7.5), I generated the following six themes (three of them are the key dependent variables) covering the variables under investigation in the RQs and reduced the number of codes to almost 30: relationships, satisfaction, motivation, attitude, frustration and resistance.

Themes were devised to represent the source of satisfaction and motivation (or, conversely, dissatisfaction and demotivation) as well as the impact of an individual's positive or negative attitude towards translation technologies on their willingness to adopt translation tools. However, in order to address the issue of overlapping codes across different themes, I opted to better define two distinct themes, namely frustration and resistance, and to delineate their specific characteristics. The theme of *frustration* encompasses all the codes that identify elements perceived as demotivating or dissatisfactory by some participants. In contrast, the theme *resistance* comprises all the codes that represent factors leading to the betrayal (to use an ANT concept, Section 3.3.1) of some participants and the decision not to use translation tools under certain conditions. The theme of resistance reflects one of the objectives of the participatory/bottom-up approach (i.e. the possibility to exert agency, decision-making and autonomy) while simultaneously representing the potential areas of weaknesses or issues that should be taken into account and resolved when deploying translation technologies in similar working environments. With regard to the theme of *attitude*, in addition to the individual perception and viewpoint of the participants, it was also necessary to consider the codes

representing the outcomes of the training in order to verify whether an ad hoc training programme followed by a mentoring phase had an impact on the attitude of the participants. Furthermore, the social dimension of attitude was investigated in the chapter dedicated to the ANT perspective (Chapter 6), and it was posited that teamwork could positively influence the attitude of participants.

Table 7.2 represents the six themes, the related codes, and the description of which elements are included in each code.

Theme	Code	Description	Reference studies
Relationship			
	interaction with TRANSLATION TECHNOLOGIES	CAT tool; NMT	
	interaction with MINISTRY COLLEAGUES	other linguists; head of office, head of department, IT personnel	
	interaction with RESEARCHER	training, job mentoring, consultant	
	interaction with TRAINEES	providing open-source documents to be aligned, provide guidance	
Satisfaction			
	Agency	participatory approach, adapt tools to their needs, create sustainable workflow, decision making	
	Autonomy	use or not translation technologies, self-determination	
	acquisition of new skills	IT competence, learning translation tools, exploiting functions of translation tools	
	job achievements	professional growth, task assigned, gaining time, reducing effort, capitalise existing translations	
	linguistic authority	professional skills, professional and linguistic experience, focus on other linguistic problem	

Theme	Code	Description	Reference studies
Motivation			
	improvement in translation tasks	avoid repetitive tasks, leverage old translations, retrieve sentences already translated, improvement in translation quality, reduce translation effort, speeding up job	
	importance of training	participants' need, one-to-one meeting	
	personal challenge	job/task challenge, solve existing workflow issues	
	professional growth	learning new skills, sharing knowledge, teamwork, professional curiosity	
	technology potential	increasing potential of TMs, TBs and NMT enriched with MoJ data	
Attitude			
	technology perception	CAT tool, NMT, IT technologies	
	IT fear	IT anxiety, potential issue deriving from the use of IT technology	
	perception of profession	self-perception, perception of ministry colleagues	
	user experience	difficulties, advantages, teamwork	Briva and O'Brien (2023)
Frustration			
	complicated tools	too many functions, too many operations to learn (steep learning curve), complex procedures	ergonomics Ehrensberger-Dow et al. (2016), O'Brien et al. (2017)
	organisational factors	future of technology in MoJ, lack of time, new way of working: changing existing procedures for assignment of translation, translation file	sustainable workflow (Moorkens, 2020a), (Canfora and Ottmann, 2020), (Farrell, 2023).

Theme	Code	Description	Reference studies
		storage, linguistic data sharing, no technical support	
	effort required to create TMs and TBs	fixing format of PDF files, alignment of old source and target documents, preparation and conversion of glossaries	
	risks of technology	terminology and accuracy issues, misleading fluency of NMT, technology misconception, exposure of sensitive data, NMT engine not properly customized for MoJ translations, de-professionalisation, deterioration of linguistic skills	(Stefaniak, 2020), Canfora and Ottmann (2020)
	technical issues	file format issue, old PCs, OCR, licenses management	
Resistance			
	acceptance of change	age of participants, difficulty in changing old working habits, IT skills, laziness, psychological resistance	
	human translator vs technology	technology cannot substitute human skills, NMT needs to be post-edited/verified/corrected by human translators	
	no trust in technology	technologies not useful for ministry translation and kind of job, prefer occasional use of generic NMT	
	prefer to work alone	no trust in colleagues, no interest in teamwork, no linguistic data sharing	

Table 7.2 Finalized themes and codes used for the (questionnaire and interview) data analysis

In the following sections I will present the results of the data collected and analysed according to each theme identified in order to answer the RQs:

1. When employing a participatory approach to the introduction of NMT integrated with CAT tools in an institutional translation production network:

1.1 What are the sources of motivation/demotivation and the sources of satisfaction/dissatisfaction in relation to the use of translation technologies?

Themes: relationships (some aspects already described in Chapter 6 under ANT perspective, Section 6.3), satisfaction, motivation

2. When considering the attitude towards translation technologies over time:

2.1 What is the impact of attitude on technology adoption?

2.2 Does training have an impact on attitude?

2.3 Does the social dimension influence attitude?

Themes: relationships (some aspects already described in Chapter 6 under ANT perspective, Section 6.3), attitude

The themes of frustration and resistance are applicable to both RQs, as will be evidenced by the relevant codes.

Figure 7.6 illustrates the intricate interrelationship between the themes and codes for the examination of data gathered through questionnaires and interviews at the conclusion of the three phases of fieldwork.

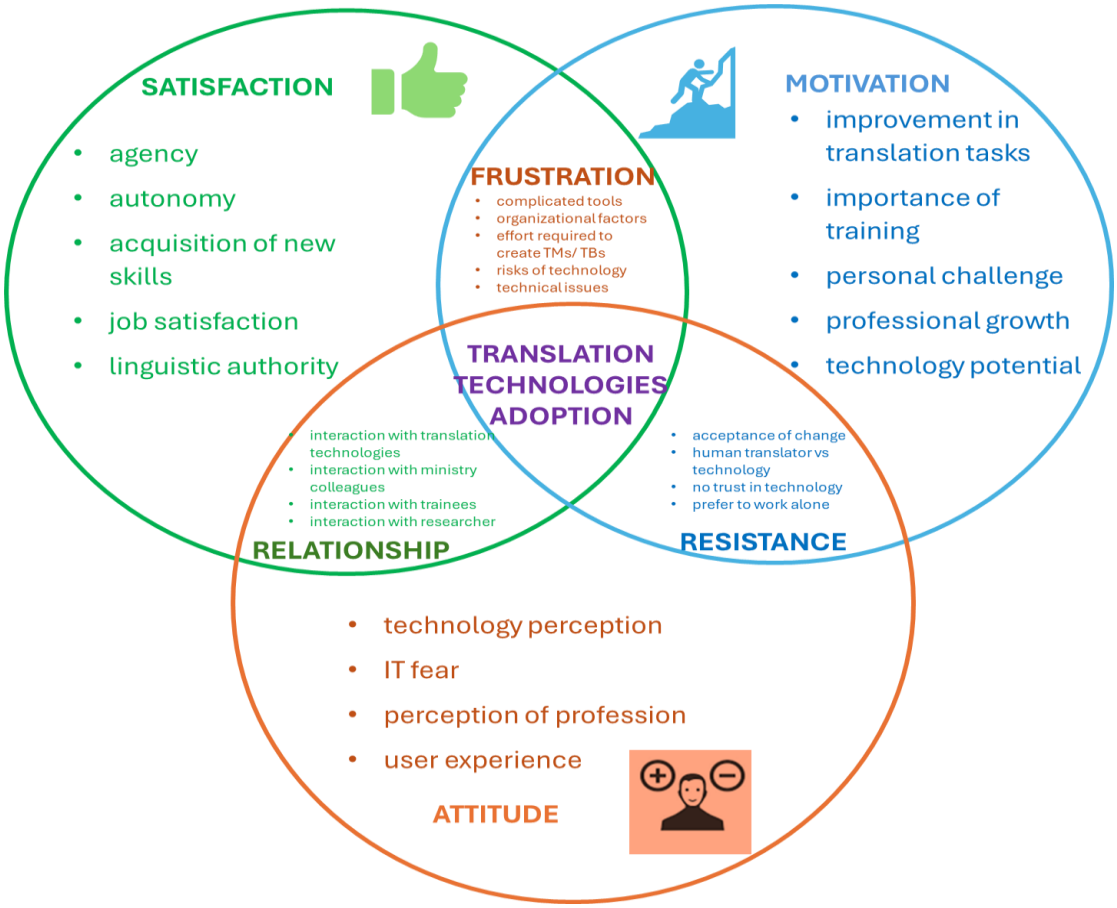


Figure 7.6 Themes and codes created applying six-stage reflexive TA

7.2 Translation technologies as source of satisfaction (or dissatisfaction): the relevance of motivation and attitude in Phase I of the research project

One of the outcomes to be examined is whether the integration of translation technologies represented a source of satisfaction for the participants, and whether that satisfaction had an effect on the integration of translation tools. Table 7.3 showed all the sources of job satisfaction highlighted by participants before the introduction of translation tools. The passion for the translation job and the languages was the first notable element expressed by all participants, followed by the interest in continuous learning and autonomy in dealing with the translation tasks expressed by 18 participants. In Section 6.3, I conducted an analysis of the social perspective of the present research, investigating how the emergence of a new actor network with the introduction of translation technologies represented a source of job satisfaction for some participants (mainly due to the new teamwork approach and linguistic data sharing required by CAT tools and NMT) and, at the same time, a source of dissatisfaction for others. The introduction of translation tools represented both a unifying and a divisive force, simultaneously introducing a novel source of job satisfaction and dissatisfaction that had not existed prior to the beginning of the research project.

However, another dimension to be investigated from a longitudinal perspective is how sources of satisfaction, motivation and the attitude towards translation tools evolved over the entire fieldwork period and the impact they had on the deployment of translation technologies and vice versa. This enabled testing of the first hypothesis of the present research (Section 1.2).

Upon completion of the initial training period, the first interview was conducted with the participants. The objective was to assess their attitudes towards translation technologies, their expectations, and any potential concerns. In particular, the participants were asked to identify the primary sources of satisfaction and frustration at their current stage of involvement in Q4r (Appendix D).

The most frequently occurring code for satisfaction was *job achievements,* provided by 16 participants out of 22. The possibility of capitalising on existing translations (nine participants [P3, P5, P6, P8, P9, P11, P12, P17 and P20]), gaining time (five participants [P4, P6, P14, P18 and P19]) and reducing effort avoiding repetitive tasks (three participants [P3, P9, P12]) were the prevailing answers. This was followed by the opportunity to share knowledge (four participants, [P2, P6, P7 and P9], and for a fifth participant, [P3], a comforting element was the possibility of sharing frustration too) with other colleagues and to acquire new professional skills (three participants [P7, P10 and P17]). However, for one participant (P13), the opportunity to share knowledge proved a source of frustration.

Table 7.3 presents a summary of the main ideas expressed by all 22 participants grouped according to topics reported in the table of codes (Table 7.2, under the themes *satisfaction* and *frustration*) and reporting the number of participants that expressed it (Appendix E). Interestingly, P3 reported as an element of satisfaction the "reduction in time and costs and the satisfaction as a taxpayer".

Conversely, P13, reporting the difficulties she was experiencing with file format and CAT tool (Figure 5.2), added that in her opinion "there is no need for us to produce words as quickly as possible, we are not freelancers, we are PA employees". Two participants did not report any source of satisfaction or frustration because they were not able to work properly due to technical problems (Section 5.2):

Source of **satisfaction**	Num. of part.	Source of **frustration**	Num. of part.
capitalise existing translations	9	steep learning curve	9
gaining time	5	technological issues	6
sharing knowledge and linguistic data	4	lack of time	6
learning in group and mentoring	3	uncertainty on real advantages of tools	6
reducing effort	3	effort required to create TMs and TBs	6
acquiring new skills	3	new way of working (change of mentality)	6
working in a more organised way	2	linguistic quality of source text	5

Table 7.3 Participants' main sources of satisfaction and frustration after technology training

The interview was conducted immediately following the first CAT training session (Section 4.7), during which participants were able to view a range of examples illustrating the potential of translation technologies. However, they did not have the opportunity to engage in comprehensive testing of the documents they typically translate on a daily basis. Consequently, they expressed concerns about the complexity of the tool to be learned. As articulated by two participants in the initial interview (see Appendix D) and expressed in similar terms by 12 participants during the one-to-one meetings (as documented in my analytic memos), participants expressed satisfaction with the opportunity provided by the mentoring phase because it allowed them to address their personal concerns or difficulties with me, the researcher, on an individual basis. The interview findings indicated that the group training experience yielded positive outcomes for three participants (P3, P4 and P13). However, six individuals reported that the training period was insufficient to enable them to decide what to do with the tools learned. As indicated by the coding, the steep learning curve (mentioned by nine participants) (see also Lagoudaki, 2006; García, 2015), the initial effort required by the time-consuming activities needed to create TMs (with the translated documents) and TBs (preparing the existing list of terms in Word to be converted) (both mentioned by six participants), and, most of all, the lack of time due to the urgent daily tasks that could not be interrupted (mentioned by six participants), were the main sources of frustration. P14's response exemplifies the aforementioned sources of frustration during this initial phase of the project: "The great effort required to prepare the materials and the lack of time to do so, the frustration caused by the amount of time required to align and homogenise the content, which is added to the already burdensome situation due to the workload that leaves no time for anything else. I also found some of the processes to be cumbersome and unintuitive (too many commands to remember, too many options to remember)". This is the first indication of a situation that would have a major impact on the motivation to continue using translation technologies. Regarding the attitude towards the technologies, in addition to the

reported data related to the steep learning curve, I think the answer of P22 to the question about their first impression of the translation tool learned during the training phase could represent the perceived complexity of Trados Studio: "I frankly think the programme is quite convoluted: it is not intuitive at all, probably to meet every translation requirement function after function has been tacked on making it, at first sight, tangled". All the participants (except for two that expressed immediately their perplexity regarding their usefulness with the kind of documents translated in the ministerial context) found the promising functions of the tool interesting and potentially useful. In particular, nine participants appeared to value the opportunity to capitalise on previous translations. P2 said "I think the use of technology is complex and at the same time fascinating. Complex because it has to be grafted onto a consolidated translation experience according to specific rules and following a different workflow. Fascinating because I realise the potential they offer for improving the organisation of my work". Notwithstanding the professional growth and the challenging opportunity offered by the acquisition of these new skills, the potential issues originating from the need to change the way of working consolidated by thirty years of experience (P12, P13 and P14), but above all, to change mentality (P7, P18 and P19), represented a source of frustration that emerged in the interviews.

When I asked about the problems associated with the use of translation technologies, six participants brought up technological issues regarding the file format of the source files and five reported the difficulties related to the convoluted style of some documents that was deemed to be "undigestible" for the NMT engine. However, among these 11 participants, six participants (P1, P3, P4, P5, P8 and P12) emphasised the necessity of evaluating the relative time efficiency of fixing the format (i.e. amend the formatting and layout issues before loading it in the CAT tool) and pre-editing the style of the source document in order to enhance its "compatibility" with the tools, or alternatively, continuing with the traditional approach of translating without the use of technologies. It is noteworthy that the necessity for uniformity and consistency in translated documents was identified as a challenge to be addressed in order to enhance translation quality by five participants. Conversely, participant P15 stated that every document was "unique in its content, and no database could be useful" and P13 perceived it as a potential risk of "a certain 'depersonalisation' of the activity of translating".

In response to the question of how translation technologies could assist them in their professional activities, the majority of answers (15 of 22) were identified with codes under the theme *motivation*. Respondents indicated that they believed the technologies could facilitate the sharing of knowledge (five participants under the code "professional growth"), the systematic organisation of translated material and the leveraging of high-quality translation solutions (eight participants under the code "improvement in translation tasks"). Seven participants anticipated that the creation of synergy with colleagues "sharing TMs and glossaries with colleagues in the ministry to achieve a single, shared translation standard" (P6) were the expected outcomes. Conversely, three linguists expressed reservations about the utility of such tools for translators with approximately 30 years of experience,

while participant P10 suggested that translation technologies "would be more useful to a young translator rather than to an experienced translator like me", in particular with the kind of documentation they had to translate. The data collected during the first interview and the analytical memos compiled during the scheduling of the mentoring phase meetings indicate that, following the training, all participants were motivated to continue with the intervention, at least to ascertain whether the translation tools would prove as effective as they had been led to believe during the training phase. Professional curiosity and the opportunity to learn new skills proved to be motivating factors even for the six translators who were initially reluctant to participate in the project due to their scepticism about the potential of translation technology.

The analysis of the data collected during the initial interview informed the subsequent mentoring phase, which lasted approximately three months for each group. This analysis helped me to identify the factors that could potentially have disrupted the deployment of translation technology in the ministry. The resolution of the file format issue and the incremental building of TMs were of paramount importance. As indicated in the analytic memos, these elements were observed to occur with greater frequency in the conversations with participants, and in particular P13 in the first interview clearly stated that "this technology, which is designed to increase productivity and improve the quality of the product, is in danger of focusing more on what the translator could or should do to achieve these objectives, to the detriment of the work that could or should be done beforehand to improve the editorial quality of the documents to be translated, especially legal documents". Moreover, the initial interview yielded insights into another noteworthy source of frustration that could potentially impede the project's successful progression. Three participants (P12, P13, P18) expressed concerns about a perceived lack of commitment from the heads of departments mainly due to the fact that "our managers don't really understand how complex this all is" (P12) and the concern that a lack of information about such technologies could lead to erroneous expectations regarding productivity on the part of heads of departments. This risk was also clearly expressed by participant P13 who stated that "I find it diminishing and frustrating to refer to the percentage or number of words that I would find already translated or typed in a translation draft produced with Trados […] to focus on the number of words or sentences that remain to be typed before the finished work can be delivered". This approach reflects the prevailing attitude of resistance to translation technologies manifested by six participants, rather than a fear of the technology itself. Rather, it is the potential risks of misuse and misunderstanding that arise from the circulation of partial or incorrect information within the translation industry that concern those who hold this view (P6, P13, P14 and P18). The failure to address the technological requirements for participants to utilise the aforementioned tools was identified as a significant concern, indicative of a potential lack of commitment on the part of the management team (P13, P18, P19 and P22). Another linguist (P16) highlighted the limitations imposed by the outdated and slow PCs, which also posed considerable challenges to other three participants.

7.3 The consolidation of new skills and the evolution of satisfaction, motivation and attitude. Interview after the mentoring period (Phase II)

During the mentoring phase I worked side by side with each participant in one-to-one sessions to address individual needs so that they had the opportunity to achieve full autonomy and to resolve minor technical problems with the different types of formats that might have prevented them from working profitably with the programmes they had learned. The meetings were arranged on a weekly basis, so that the translators could find a suitable time slot to fit in with their assignments and deadlines, even if not all the participants granted the same level of availability for such meetings. Some of the results of the second questionnaire administered after this phase were discussed in Chapter 6. This section further investigates elements that emerged in the questionnaire, analysing the data from the second interview.

The first question I asked was to what extent translation technologies had affected the nature of their work. At this intermediate stage, the technical and linguistic benefits were not so obvious, as all the participants were unable to use translation tools on a daily basis due to unresolved formatting issues, which meant that they could only use the tools with source documents (Section 5.2) that could be properly opened in the CAT tool. As reported in the interviews and noted also in the analytic memos, this had a significant impact not only on the satisfaction of participants (representing one of the main sources of frustration), but also on the ability to incrementally build TMs and TBs in order to get better leverage and at the same time reach the one million words required for the initial training of the NMT engine (Section 5.4). The data collected with the questionnaire and the interview indicated that, despite the unfavourable circumstances, motivation remained high among 16 participants. The direct observation and the analytic memos (Section 4.8.3) I took during the period in which I had the one-to-one meetings suggested to me that this was due to the training and subsequent mentoring period, which improved their attitude to translation technologies. This was evidenced by the promising results obtained (participant P13 stated, "I used a Ferrari as if it was a 500, I guess…") and the change in personal attitude towards technology that I observed working side-by-side with them. For instance, the nature of their inquiries became increasingly technical and pertinent. When I was not present in the office, they wrote to request my input and guidance, indicating that they were employing the translation tools with greater frequency and intensity compared to the previous phases. A group of five participants also inquired about the most effective means of sharing TMs and TBs between the two detached offices, suggesting an intrinsic interest in implementing the technology. The coding of the second interview supports this observation, as it revealed that the codes associated with the theme of satisfaction occurred 41 times (almost evenly balanced among 18 participants, absent in P13, P16, P18 and P19), whereas those pertaining to the theme of motivation recurred 159 times (distributed among 21 participants, with particular relevance in P4, P5, P8 and P12, and absent in P14). A similar discrepancy was observed in the initial interview too,

with satisfaction occurring 32 times (almost evenly balanced among 19 participants, absent in P1, P15 and P22) and motivation 144 times (almost evenly balanced among all the 22 participants).

Two participants experienced technical problems with their PCs that needed to be replaced (Section 5.2). Another four participants decided only to perform some tests during the one-to-one meetings but not to use the translation tools in their daily activities for various reasons: P14 preferred to use other free online programs she was already using before the project on an occasional basis; P18 decided to wait for better leveraging from TMs because she did not have time to perform the alignment of translated documents; and another two considered the content of the documents they had to translate not suitable for translation tools: "unfortunately, I fear that we are the most effective database for the work we do" was the comment of P15. These outcomes could be considered also an outcome of the possibility to choose autonomously which technology to adopt and whether or not to use translation tools. The interview confirmed the findings already identified in the data collected with the second questionnaire that revealed a reduction in the number of participants experiencing difficulty with the steep learning curve of the tools. Seven (P11, P13, P14, P15, P16, P18 and P21) out of 22 declared they did not benefit from the use of translation tools due to the inappropriateness of the type of documents to be translated and five (P7, P11, P13, P19 and P20) due to the complexity of using the programmes.

While in the questionnaire six participants expressed their frustration at having to change the way they work, the interview revealed that translation tools proved to be a source of personal satisfaction for other seven participants because the use of such tools proved an efficacious stimulus, "fostering a change of mentality" (P4): "I think it's about having an open mind and being willing to try new things, even if it means stepping outside of your comfort zone" (P19). In particular P2 stated that "I had to change my mentality and my system of working, I had to learn a different one and I struggled because it takes time and concentration, it is difficult to reconcile with work. Work done with the traditional method went faster, real results take time. It's all an investment of time and concentration that must be constant, I still don't see concrete results, but I feel the prospect". Among the remaining nine participants, six indicated that the opportunity for personal and professional growth was a source of satisfaction, while three identified knowledge sharing and uniformity from a stylistic perspective as a source of professional satisfaction. Noteworthy, participant P19 highlighted that she felt "satisfaction, even when I see that I can use [translation tools], despite my venerable age and the antiquated methods I use". So, age factor once again emerges as a relevant element to be considered (Section 6.1.1).

With regard to the theme *motivation*, 21 participants cited one or more of the reasons for using translation technologies as set forth in Table 7.4. The table provides an overview of the number of translators who referenced a particular statement assigned to a specific code:

Source of **motivation**	Num. of part.	Source of **resistance**	Num. of part.
speeding up job	16	old working habits	9
improve job quality	14	not useful for kind of job	8
leverage old translations	12	no trust in technology	8
personal challenge	9	relationship with management	7
reduce translation effort	9	human translator vs technology	6
avoid repetitive tasks	7	psychological resistance	5
professional growth	7	complicated tools	5
collaboration with colleagues	5	no trust in colleagues	4
solve existing workflow issues	3	uncertainty on acquisition of licenses	3
technology potential	3	age of participants	3

Table 7.4 Participants' main sources of motivation and resistance after mentoring period

The possibility of speeding up jobs, improving job quality, leveraging old translations, reducing translation effort and the possibility to experience a personal challenge are the main motivating factors resulting from the second interview. It is noteworthy that a small subgroup of three participants, who were also among the promoters of the research project, began contemplating the potential for enhancing organisation and systematisation in their daily activities (P1, P2 and P3). Another three (P5, P8 and P12) participants expressed interest in the potential applications of technology. For example, P12 stated that they believed "humans should not do what machines do faster and better but concentrate on the most important part of our work, namely terminology research and in-depth studies". During the interview, eight participants expressed their perplexity regarding the efficacy of translation tools in relation to the type of documents they were required to translate (Table 3.4). However, their professional curiosity motivated them to persevere in their efforts to ascertain the potential outcomes. Two further participants identified two additional key motivating factors: the potential for avoiding boredom due to repetitions (P3) (or the necessity for repetitive input of codes and numbers) and the possibility of breaking the monotony of some repetitive tasks (P12).

Among the demotivating factors (coded also under the theme *frustration*), some elements emerged that were already reported in the first interview: the issue of file formats, poorly written documents with content that requires interpretation, the extreme heterogeneity of the originals and the obsolete PCs. However, in this second interview for the first time it was mentioned by three participants that they were uneasy about working with temporary licences without having the certainty that the tools would be adopted in the future by the Ministry. It is noteworthy that, at this stage of the project, in addition to the complexity of the tools (reported by five participants) and the initial learning difficulties, entirely new sources of frustration emerged. Five participants expressed a certain "psychological resistance" (as defined by P6), reported by P4 as a kind of "difficulty in understanding the mechanism of computer-aided translation, because it was not immediate, perhaps more due to mental barriers

and difficulty in overcoming a psychological block". P17 described it saying that "I am obsolete, I prefer to go back to the inkwell, […] I belong to the generation that learned by flipping through paper and using dictionaries, it takes time" and P2 stated that "what prevents me a bit [from using tools]... no look, it's not even scepticism, it's a bit of laziness and a bit of being tied to the method used in the past that I realise is outdated". Six participants reported a certain resistance to translation technologies, in the case of P18 because "It takes time to learn and create memories, so I end up translating as I have always done" or because as reported by P15 "considering the kind of documents I have to translate, I'm more efficient than a machine" (Table 3.4, demotivating factors).

Once again the doubts regarding the commitment of management was presented as a demotivating factor by seven participants, as mentioned, for example, by P13 because "I don't see that there has been any change in the critical points that we have highlighted, and why it seems that all the work of speeding up and improving quality is to be borne by the translator, when this should not be the case, and why it risks making this work appear to be a very fast and qualitatively improved job thanks to this type of technology, and it doesn't seem to me that this is the case". This last observation was particularly interesting because apart from being a demotivating element, it introduced the idea of resistance due to a misconception and possible misuse of technology.

The necessity of devising a novel workflow to integrate translation tools highlighted the existence of an underlying organisational issue. While nine participants indicated that they encountered difficulties in modifying their established work habits, six participants posited that reorganising workflows to enhance the integration of translation technologies might prove an effective means of addressing this underlying issue. P3 stated that she "expect[s] more cooperation and planning, which is lacking […] in the last few years […] probably this tool, which requires a certain method and organisation of job, will also make it possible [...]. We are only dealing with emergencies at the moment. If you don't make the managers aware of what we are doing with this project, they won't notice this. It is a change that affects everyone, and you can also think about working with other administrations". This is another notable outcome of the project that unifies the ANT perspective with the elements analysed in the present chapter: the emergence of the idea of moving beyond the implementation of translation tools and exploring the possibility of extending the experience to other administrations that may have similar needs. I had previously participated in conferences and seminars at the university, where I had the opportunity to engage in discussion with translators from other ministries and organisations. During the one-to-one mentoring sessions, I discovered that these five participants were sharing their experiences of the research project with those colleagues that I met in the past. This represented a further unexpected outcome of the project, which will be discussed in the conclusions.

In this second phase the difficulty emerged of finding a balance between over editing and under editing, because sometimes there was the risk mentioned by P12 "that some things slip through the

cracks, perhaps because you rely too much on technology". Another recurring factor reported by five participants during this second interview was the frustration due to poor IT skills (two participants) and age (three participants). For example P5 said that "coming to terms with one's own computer ignorance and lack of digitalisation, also due to age" and the working environment which was "in some ways very antiquated". Mental attitude (also influenced by age) and the working environment proved to be not only a source of frustration but also an additional element of potential resistance to translation technologies. In addition, three participants reported specific issues related to the use of TMs and NMT (at this stage the participants working with other languages than English were using a generic engine, not a customised one). For example, as stated by P 22, "with machine translation, it's hard to keep track of everything because it can be misleading. It works well with meaning fluency, and this fluency can lead you to think that something was translated correctly when it wasn't", and as reported by P12, "one of the biggest issues is that you tend to rely on what the machine translation suggests or what the Trados system reports without paying much attention, especially when the changes are minor. In my opinion, it's a very different job, and you should develop post-editing strategies". Ultimately, all 16 participants who tested the NMT (in both customised and generic forms, and whether integrated or not in the CAT tool) were exposed to this well-known risk associated with its use (Section 5.1).

With the exception of six participants who indicated a lack of expectations regarding the capabilities of translation tools, the remaining 16 participants expressed one of these expectations: enhanced efficiency, organisational improvement, strengthened professional relationships with colleagues, and as stated for example by P6, "overcome my psychological resistance". When I asked what should be changed to improve the use of translation technology, participant P19 stated that "the personal attitude should also change a little, perhaps being more open to the new and to what may at first seem to slow down the work". Although the most recurring answer reported by all the participants was obviously the file format, the necessity to enrich TMs with a more substantial amount of linguistic data "reducing the burden of the alignment task" (P16) was another sensitive point reported by 10 participants. For example, participant P8 said that "I think that the use of translation tools should be compulsory, in the sense that as long as everyone does it on their own, there is little cooperation. If it became compulsory, we'd get better results". With approximately four months remaining before the conclusion of the research project, the inability to resolve the issue of file format was a significant challenge. However, the collaboration of five trainee students from the university proved to be an effective solution for data preparation and TM enrichment. By the end of April 2023, the first training of the NMT engine with one million words for the linguistic combinations English–Italian and Italian–English had been completed (Section 5.4). Consequently, 14 participants were afforded the opportunity to test the potential of integrating TMs and TBs with a customised NMT engine. Given the limited time remaining, I opted to concentrate the efforts on achieving the minimum word count required for an effective training at least in one linguistic combination. The engine was also trained

on the linguistic combinations comprising French, German and Spanish. However, the total number of words reached with the help of trainees was relatively low (approximately 300,000 for each language), and therefore the resulting improvement was not significant. So, I dropped the experiments with the trained engines for the other language combinations.

7.4 The paradox of translation technologies: how tools can both drive and deter adoption (Phase III)

Upon the conclusion of the research project, the third questionnaire was administered, and the final interview was conducted. Due to the summer holiday period, the latter required approximately one month to complete with all participants. Despite seven participants indicating a preference not to utilise translation technologies in their daily activities, no translators opted out of the project. All 22 participants completed the final questionnaire and took part in the concluding interview. Figure 7.7 illustrates the two primary factors that contributed to a certain degree of demotivation among participants with regard to the utilisation of translation tools.

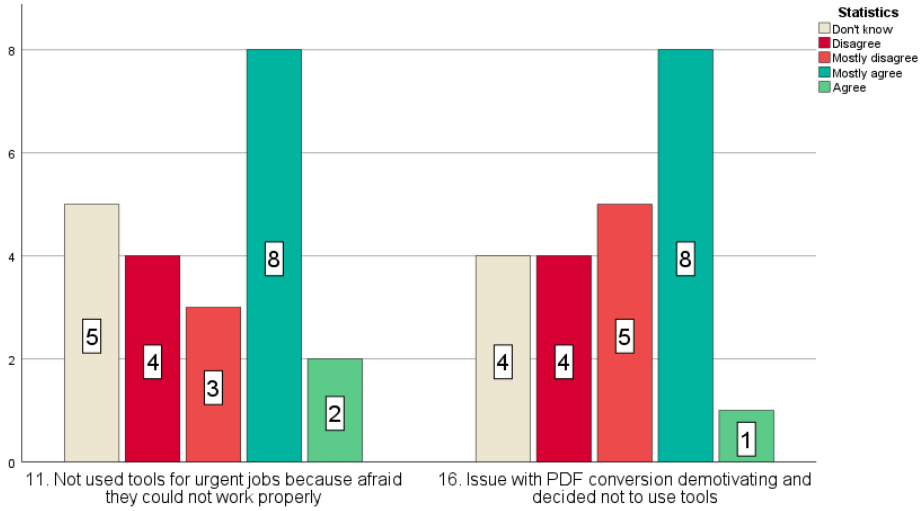


Figure 7.7 Demotivating factors in the use of translation technologies

As illustrated in these graphics, at the conclusion of the project, 10 participants agreed or mostly agreed that they did not use translation technology for urgent jobs due to concerns they could not work properly (Q11). This was primarily attributable to the issue that arose from the conversion of source text to PDF format, which frequently resulted in a text that was not usable in CAT tools (Q16) (Section 5.2). However, before the research project ended, 12 other participants (including those that in Q11 and Q12 opted for the "don't know" answer), decided to draft a petition to the administration with the intention of acquiring the necessary licences to employ the translation tools.

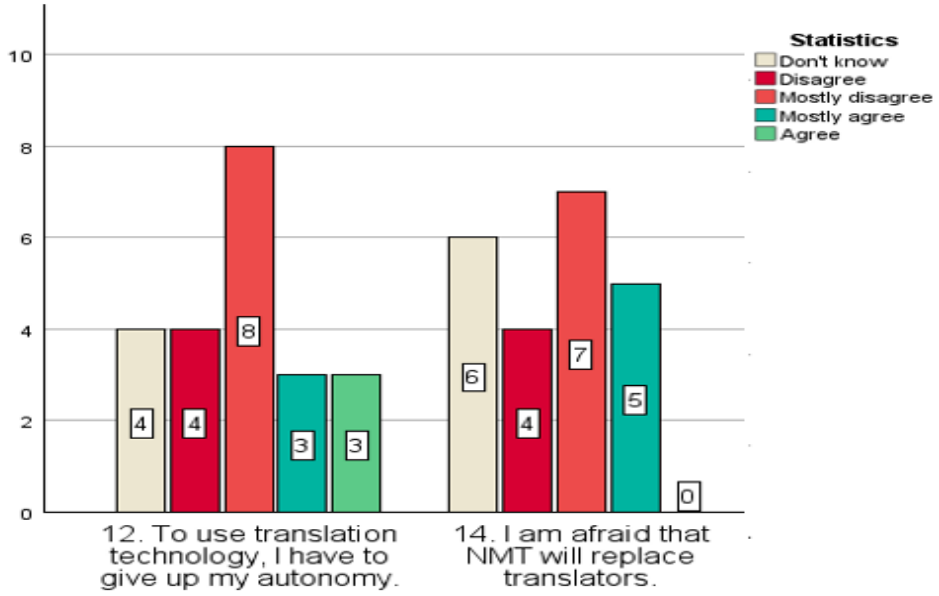


Figure 7.8 Technology fear

Questions 12 and 14 (Figure 7.8) addressed two additional demotivating factors identified in the literature review (Section 2.2.1 and Section 2.3, respectively) and included also in the TA under the codes *IT fear* and *technology perception* of the theme *attitude*. These factors pertain to the potential loss of autonomy in performing translation tasks using NMT and, more worrisomely, the possibility of being substituted by NMT. Six participants indicated agreement or partial agreement with statement Q12, while five participants partially agreed with statement Q14. Conversely, 12 participants indicated disagreement or partial disagreement with statement Q12, and 11 participants indicated disagreement or partial disagreement with statement Q14. This proportion reflects the trend that was already observed in Phase II, where six participants started manifesting clearly their negative attitude towards the introduction of translation technologies.

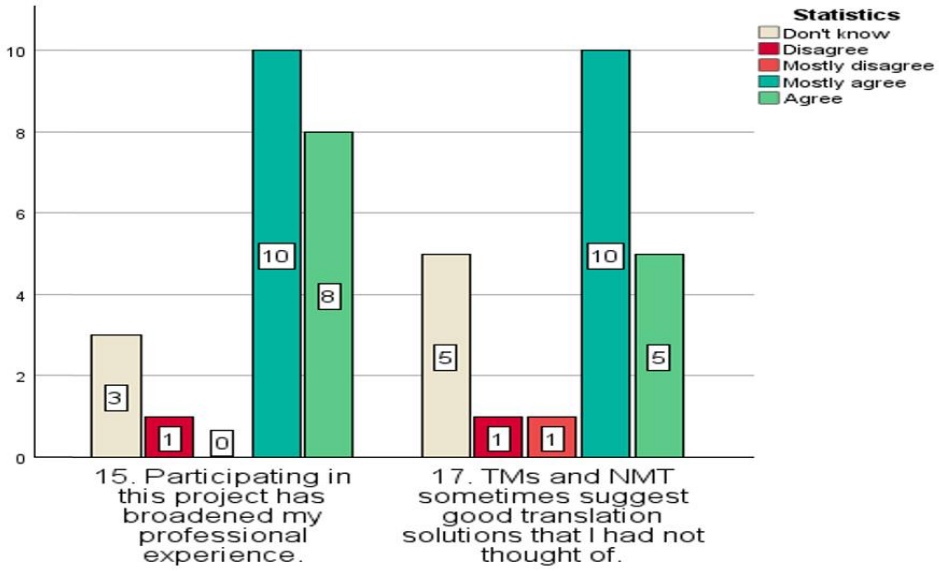


Figure 7.9 Professional satisfaction

Further confirmation of this assumption could be found in Figure 7.9 representing the source of satisfaction in the use of technologies. While attitude towards translation technologies may have influenced the decision of nearly half of the participants not to adopt them, question Q15 suggests that the use of translation tools had a beneficial impact on the professional growth of 18 participants (who agreed or partially agreed with the statement). In addition, 15 participants indicated agreement or partial agreement with question Q17, which inquired whether TMs and NMT sometimes suggested good translation solutions that the participants had not previously considered.

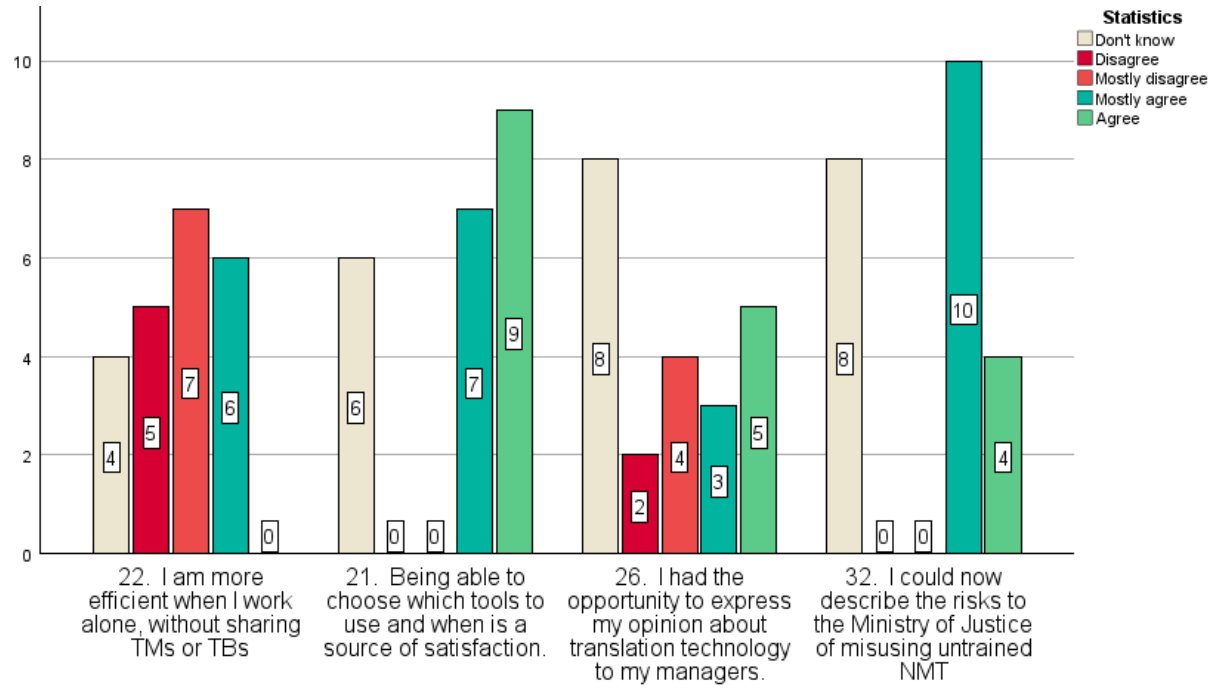


Figure 7.10 Relevance of agency and autonomy

Figure 7.10 illustrates the questions from the questionnaire pertaining to the two fundamental factors that could have influenced the adoption of translation technologies at the Ministry of Justice: autonomy and agency of participants. It is notable that the two statements related to autonomy (Q21) and linguistic authority (Q32) are the only ones in which there are no participants who indicate disagreement or slight disagreement. These responses underscore the significance of exercising one's linguistic authority and professional expertise, of having the autonomy to choose which tools to use and when to use them, and of being able to identify any potential risks associated with the use of non-trained NMT. This may be regarded as an outcome of the ad hoc training in conjunction with the participatory approach.

However, an analysis of the remaining two statements in the figure reveals two significant factors that contribute to a lack of motivation. In statement Q22, six participants indicated that they felt more efficient when working alone, which corroborates the trend identified in the second questionnaire that some participants did not find it advantageous to share linguistic data. The number of participants who expressed disagreement or slight disagreement (6 in total) in response to statement

Q26, along with the number who selected the 'don't know' option (8), serves to reinforce the conclusion that a lack of managerial commitment to supporting the project is a significant demotivating factor, a finding that emerged during the mid-term interviews (Table 7.4). This may be regarded as an additional consequence of the bottom-up approach, given that, despite the difficulties encountered during the transition in leadership (Section 4.8), a number of participants expressed individual satisfaction (autonomy and agency, Table 3.2) with the experience of promoting a change (participatory approach, Table 3.4) and motivation to continue with the project that they were able to obtain the necessary licenses approximately one year after the conclusion of the research.

The final items in the third questionnaire were designed to assess the influence of training and mentoring on participants' attitudes towards translation technologies and their satisfaction with the skills they had acquired.

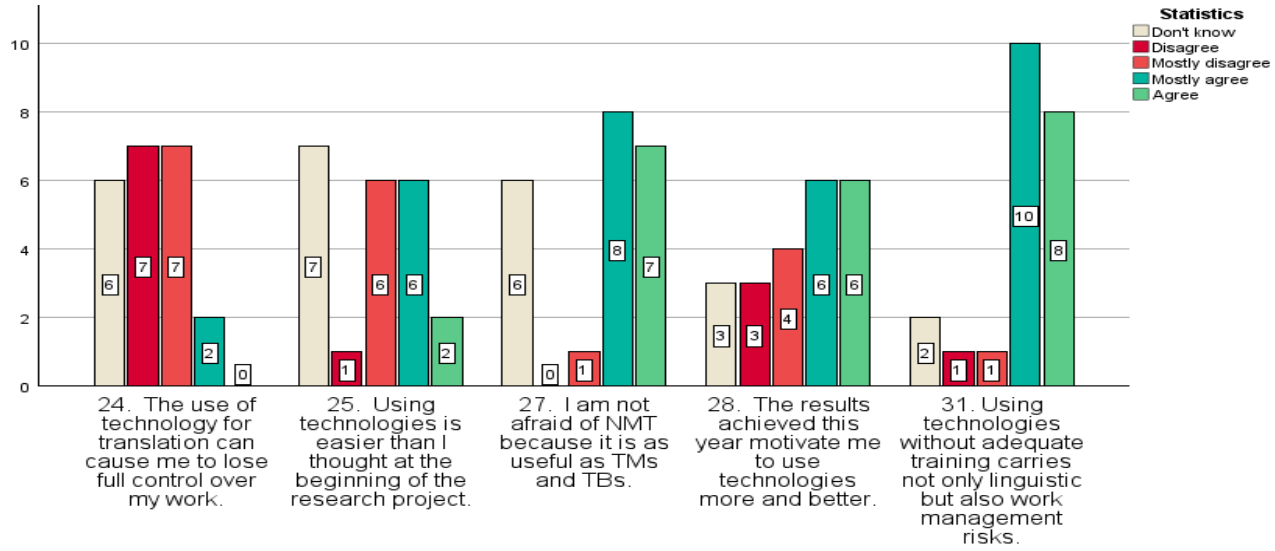


Figure 7.11 Impact of training and mentoring on participants' attitude

Two participants (P8 and P18) indicated that they mostly agree with the assertion that the implementation of translation technologies might result in a loss of complete control over their job functions. The remaining six participants selected the "I don't know" option. In response to statement Q25, eight participants indicated that they had initially underestimated the ease with which translation technologies could be utilised, while seven selected the "don't know" option. In response to statement Q27, only one participant indicated apprehension regarding NMT. Conversely, 18 participants expressed agreement or strong agreement with the assertion that training in translation technologies is crucial for mitigating linguistic and work management risks (Q31). In addition, statement Q28 provides evidence that 12 participants were motivated to use the translation tools more frequently, with the aim of enhancing their knowledge of these tools, in light of the outcomes achieved throughout the research project.

In the open-ended question related to any change they would have suggested to the research project they participated in, eight participants stated that additional time would be required for training and

the project's overall duration. The possibility to extend the training period according to the needs of translators is an element that should be considered when planning an ad hoc training on translation tools. Another six participants mentioned the need for "increased awareness among managers of the risks of using machine translation with untrained engines, of the real expectations in terms of time savings" and "greater willingness among top management to get translation technologies fully implemented", "a more collegial and shared participation", and one participant expressed also the desire to have an NMT engine already trained. The final interview served to reinforce the necessity for a more in-depth theoretical and practical training programme on translation technologies as suggested by participants P2, P6 and P11 during the second interview. This would enable participants to gain a deeper understanding of the reasons behind the return of errors by NMT and to address the concerns raised regarding the reliability of NMT, particularly in the context of specialised terminology. However, during the final stages of the mentoring phase and throughout Phase III, when I had the opportunity to observe participants in the office and engage with them directly, I observed that all participants who had adopted translation tools into their daily activities demonstrated an understanding of the fundamental skills required to consciously choose which texts would benefit most from a combination of TM and MT, and which would be less effectively translated by MT. In particular, nine participants highlighted the challenges posed by legal opinions or judicial documents, in particular those written in Italian, which often require a high level of linguistic expertise to translate accurately. The complex style, lengthy sentences and occasionally ambiguous content of these texts would not be well-suited to NMT. The issue of confidentiality also precluded the utilisation of NMT, which at the time of the research project was stored in the cloud rather than on-premises. Interestingly, five participants declared that they preferred always to receive a suggestion from NMT, because it was in any case an opportunity and in the end they could choose to completely ignore it. However, the most recurring opinion was that MT output could not be trusted and the human control over every single word was needed. As reported by P18, for example, "it's important to remember that the human aspect of the translator is crucial. It's always best to be vigilant" because, as highlighted by P15, "mistakes are always possible. When you're reading a text that's well-written, it's easy to take it at face value. The level of attention you need to use NMT is different anyway, so I think NMT is a bit risky to use". In addition, there is also the consideration of P2 who said that "the machine is there to serve the human being, it is the human being who must manage the machine and its proposals" and the observations of P3 stating that "It gives you a starting point, but it can also be misleading [...] it suggests solutions that seem good, but they might be risky to accept […] you always need to be critical […] with solutions proposed by a machine".

The last open-ended question in the questionnaire asked participants if their attitude towards translation technologies changed over the duration of the research project. Interestingly, 14 participants confirmed that they were more aware of the pros and cons of these technologies, so they could make a more informed choice about whether to use them. Seven participants attested

that their attitude had not changed, while two opted for the "don't know" answer. This result partially confirms the hypothesis 3 in Section 1.3 (do Carmo, 2020; Alvarez-Vidal et al., 2020) because the training had an impact on the attitude for five of the waver participants (Section 6.1.1), but at the same time confirmed the statement of Gough (Section 3.6) that attitude may prevail over training outcomes and influence the use of technology, as demonstrated by seven participants.

In order to gain a deeper understanding of outcomes produced by the training and the mentoring as well as the participatory approach implemented, I asked participants what they would choose to talk about if they had to explain to someone outside the Ministry of Justice how translation technology has changed their work. For example, the opinion of P1 presented some idea shared by other participants: "these technologies have definitely changed the way we approach translation, which used to be based on our own experience and style. It makes you give up your personal style a bit in favour of the collective, for the benefit of all. I have found it useful in terms of speed and for some translations, such as legal articles, but you have to be very careful, you can be misled". Eight participants focused on the potential of an innovative way of working, and in particular P2 underlined the "new way of organizing and approaching work with the prospect of greater speed and greater sharing of experience with colleagues". Teamwork represented a source of satisfaction for seven participants, as reported for example by P3: "I enjoyed working in groups and rethinking and sharing some translation choices with colleagues". The retrieval of previous translations proved pivotal for three participants, while four participants identified the acceleration of work as a key outcome. Four participants highlighted the potential for knowledge sharing through the creation of TMs and TBs, while five participants emphasised a more collaborative approach to work. For three participants, the TMs were useful to enhance the quality of translations and facilitate the confrontation with other colleagues. Another participant stated that the introduction of TMs also required a kind of planning of translation work, because it was really important to evaluate what should be stored in such databases, considering that at a later stage translations would be retrieved by everyone, and the same TMs would be used to train the NMT engine. For participant P17, the relationship with the non-human actor went even further, "a symbiosis that can be achieved between the human brain and computer technology applications, making daily work less monotonous". Conversely, seven participants reported that they were unable to work properly with translation technologies due to unresolved IT issues (file format or obsolete PCs) and that for them the research project was just a presentation of new technologies, a cultural enrichment that did not bring any change to their work.

When I asked if the translation technologies had ever forced them to make a translation choice that was correct but did not reflect their style and if this was source of frustration, 16 answered with a negative response, and the most shared opinion expressed in various ways by participants about MT was that the machine merely suggests a potential solution, but the ultimate decision rests with the translator, who must assess which option is most appropriate in the given context according to his/her professional experience. Analysing all the answers another common element was that the

crucial objective of ministry translators, notwithstanding the issues that could arise from the use of translation tools (Section 7.2), was to ensure that the final translation was accurate and met the desired standards. In particular, one of the main ideas expressed by participant P1 was that "to get the most out of TMs and NMT, you have to be willing to set aside your personal style. The Ministry pays for a correct translation, so they don't care about everyone's style. I'm fine with that". Another interesting observation of participant P2 was that "the machine makes suggestions, but it doesn't really impose anything, it depends on how you use it. You also have to know how to train it according to your needs". Participants P1, P2 and P5 additionally indicated that despite experiencing a degree of frustration associated with the necessity to alter their style, they were motivated to modify their attitude towards their work, given their appreciation of the advantages afforded by the utilisation of translation technologies. Interestingly, P6 observed that "certainly, a choice other than my own could be seen as a threat to my ability, but also as an improvement in my ability, so I tried to choose the second solution", and P9 stated that "it is a strange feeling for me to accept it, but I am aware that it can be a valid alternative".

It is noteworthy that the final interview yielded insights into the emergence of novel factors of resistance among the six participants who opted not to utilise translation technologies. In particular, P13 reported that "it frustrates me to think that I can find things that are already established that are translated this way because someone translated it in that way", P14 stated that "I would have a certain resistance to using other people's suggestions, at least for types of solutions that, in my case, are the result of decades of experience" and P16 answered that "I would feel a bit restricted, I wouldn't like it so much". In the second questionnaire and interview, six respondents had already formed the opinion that it was not beneficial to share knowledge and linguistic data with other colleagues, nor advantageous to engage in collaborative work, these results further corroborate the negative attitude towards translation tools that has been previously observed. It is noteworthy that in this third interview, the frequency of occurrence of the codes related to satisfaction exhibited a fourfold increase (160, almost evenly balanced among 16 participants, while P7, P11, P13, P14, P16 and P20 present only 1 or 2 occurrences), while the codes related to frustration decrease by about half (75, almost evenly distributed among 19 participants, absent in 3) and there was an increase also in those related to resistance (164, clustered in particular around P11, P13, P14, P15, P17 and P20). Additionally, there was a slight reduction in the number of codes related to motivation (113, almost evenly balanced among 16 participants, while P7, P11, P13, P14, P16 and P20 present only 1 or 2 occurrences).

When I asked about the future of translation technologies in three years' time in the Ministry of Justice, 13 participants stated that they believed translation tools would further improve their job. Nine participants declared that they were not willing to use such tools, as they preferred to continue with their traditional approach to work. This was because they believed that such technologies were not advantageous for the kind of translation performed in the Ministry. Participant P22 added that

"sometimes I also worry that translation systems that are so cutting-edge, so accurate, so game-changing, might eventually make the human translator obsolete".

7.5 Concluding remarks

This approach to data analysis allowed me to gain a more comprehensive understanding of the impact that the introduction of translation technologies had on the group of translators within the Ministry of Justice. In addition to the social and relational perspective, this approach enabled me to gain insight into the personal and professional aspects of the translators' experiences.

The combination of the quantitative and qualitative data enabled the factors representing sources of satisfaction for some participants and of frustration for others to be identified with greater clarity. Furthermore, it was possible to more closely examine the relevance of motivation in the preliminary stages of the research and the evolution of the attitude towards translation technologies with the increased familiarity gained through the process. This was observed to occur in two distinct ways: in some participants, interest and a desire to acquire further skills developed; while, in others, distrust and resistance towards these tools intensified.

Even though some of the problems that were a source of frustration for the participants (such as the file format problem or the obsolescence of some PCs) could not be solved during the course of the research, the satisfaction of discovering how these tools could support their daily activities, and the contribution provided by the trainees in aligning old documents and preparing data for engine training, motivated some translators to continue the intervention by seeking alternative solutions that would allow them to use the translation tools anyway (e.g. fixing the issues of the file with an unsuitable format) and to join forces in order to obtain programme licences.

Two fundamental factors may have also influenced the uptake and adoption of translation technologies at the Ministry of Justice. These factors, which were identified through a combination of questionnaires and interviews, are the autonomy and agency exhibited by the participants in the research, as well as their linguistic authority and professional expertise. The autonomy to choose which tools to use and when to use them, as well as the ability of the participants to identify any potential risks associated with the use of non-trained NMT, can be seen as outcomes of the training programme, which was conducted in an ad hoc manner, as well as the participatory approach taken by the researchers.

The next chapter will integrate the analysis conducted in the present chapter with that performed from an ANT perspective (Chapter 6) to provide a comprehensive response to the RQs.

Chapter 8 Conclusions

8 Introduction

This research was the result of a favourable interaction between the academic and professional spheres, representing a collaboration between professionals also engaged in academic training. In addition to answering the RQs, a collateral objective of this study was to examine the implementation of translation technologies in the Italian Ministry of Justice, with a particular focus on two key aspects. Primarily, there was an academic interest in further investigating some research gaps related to the human factor in the use of such technologies with professional translators in a workplace (Chapter 2). Secondly, there was a professional interest in the perspectives of linguists who were seeking ways to improve their daily work. The design of the present workplace research combined both aspects, while investigating the multidimensional aspects of sources of satisfaction, motivation and attitude in relation to the adoption of translation technologies.

It is noteworthy that in the revised version of the instrument proposed by Rodríguez-Castro (2024), the researcher highlighted the significance of two central aspects of the approach that I proposed to the Ministry of Justice: firstly, the necessity for training and secondly, the importance of workflow optimisation required by the implementation of translation technologies. A further illustration of the relevance of the present research is the special issue of Translation Spaces (2024) which identifies satisfaction as a key factor in the acceptance of new technological challenges (Ruokonen and Koskinen, 2017; Ruokonen and Svahn, 2024). This issue was published four years after the commencement of my PhD research.

The present three-phase convergent parallel mixed methods research aimed at evaluating: the impact of the adoption of translation technologies on linguists' sources of satisfaction and motivation; the outcomes of the interaction between human and non-human actors from an ANT perspective; and the influence of translators' attitude on the acquisition of new skills and the application of new competencies in everyday activities. Quantitative and qualitative data were collected in parallel, analysed separately, and then merged in each phase to reach conclusive answers to the RQs, as reported in Section 8.1.

8.1 Research questions and findings

In order to comprehensively address the multifaceted nature of satisfaction and motivation in relation to the use of translation technologies, the first research question was divided into three discrete sub-questions:

RQ1: *When employing a participatory approach to the introduction of NMT integrated with CAT tools in an institutional translation production network:*

1.1 What are the sources of motivation/demotivation and the sources of satisfaction/dissatisfaction in relation to the use of translation technologies?

This question was addressed in a longitudinal perspective analysing first the data collected with the initial questionnaire presented in Section 6.1.2 to evaluate which were the main sources of satisfaction before the beginning of the research project (Table 6.3). The data collected indicated that they were mainly linked to the nature of the job performed by the translators at the Ministry of Justice (e.g. the subject matter, the need for constant linguistic enrichment, the language skills required), the relevance of the job from a social perspective and the autonomy they had in performing their activities. Technical factors like the deadlines, the quality of source text and the format of the documents to be translated represented the main sources of dissatisfaction. The primary motivating factors to introduce translation tools were professional curiosity and the opportunity to improve daily activities by addressing the challenge of the increasing translation volumes during the recent period.

After the training (Phase I), the first interview (Section 7.2) aimed at verifying the expectations, and any potential concerns, investigating the primary sources of satisfaction and frustration at their current stage of involvement. Leveraging existing translations, gaining time and reducing effort, avoiding repetitive tasks were the main sources of satisfaction, while the steep learning curve, the technological issues (mainly due to PDF file format) and the lack of time were the primary sources of frustration (Table 7.3). The effort and time required to prepare TMs and TBs were identified as factors that could have had a major impact on the motivation to continue using translation technology.

Following the mentoring phase (Phase II) and the consolidation of new skills, despite the inability of participants to use translation tools on a daily basis due to unresolved formatting issues (Section 5.2) and the steep learning curve, motivation to use translation tools remained high for 16 participants due to the advantages experienced (retrieval of old translations, speeding up the job and avoiding repetitive tasks). Personal and professional growth were the main sources of satisfaction reported. The need to change working habits, implementing a new workflow, and sharing of TMs and TBs represented a personal and motivational challenge for nearly half of the participants, while six participants exhibited a resistance to these necessary changes. In this phase, two further sources of resistance emerged. The first may be characterised as “psychological resistance” according to the participants' own definition. The second was uncertainty related to the future of the research project. This latter factor was concerned with the commitment of management to solving technical problems and continuing the use of technology after the completion of the study. The expectations of motivated participants were enhanced efficiency, organisational improvement, and strengthened professional relationships with colleagues.

Upon completion of the research project (Phase III), only 14 participants were afforded the opportunity to test a customized version of the NMT engine (Section 7.3). The issue pertaining to the PDF format of the source texts was confirmed as the primary factor of demotivation. However, 15 participants expressed satisfaction with the professional growth and the opportunity to receive valuable translation solutions from TMs and NMT that they had not previously thought about (Section

7.4). While it is important to note that in Phase I two participants were affected by technical issues with their PCs, the potential for the utilisation of translation tools to be discontinued following the conclusion of the research project and the inability to solve PDF format issues coupled with the apparent absence of managerial support for the project constituted a significant source of demotivation. The paradox of the translation technologies was that the opportunity to share linguistic data and promote collaboration between colleagues motivated 12 participants to continue using translation tools and six to decide not to use them for the moment.

Figure 8.1 represents the longitudinal perspective of the data related to satisfaction in the use of technology in Phase II (six months after training) and Phase III (end of the research project):

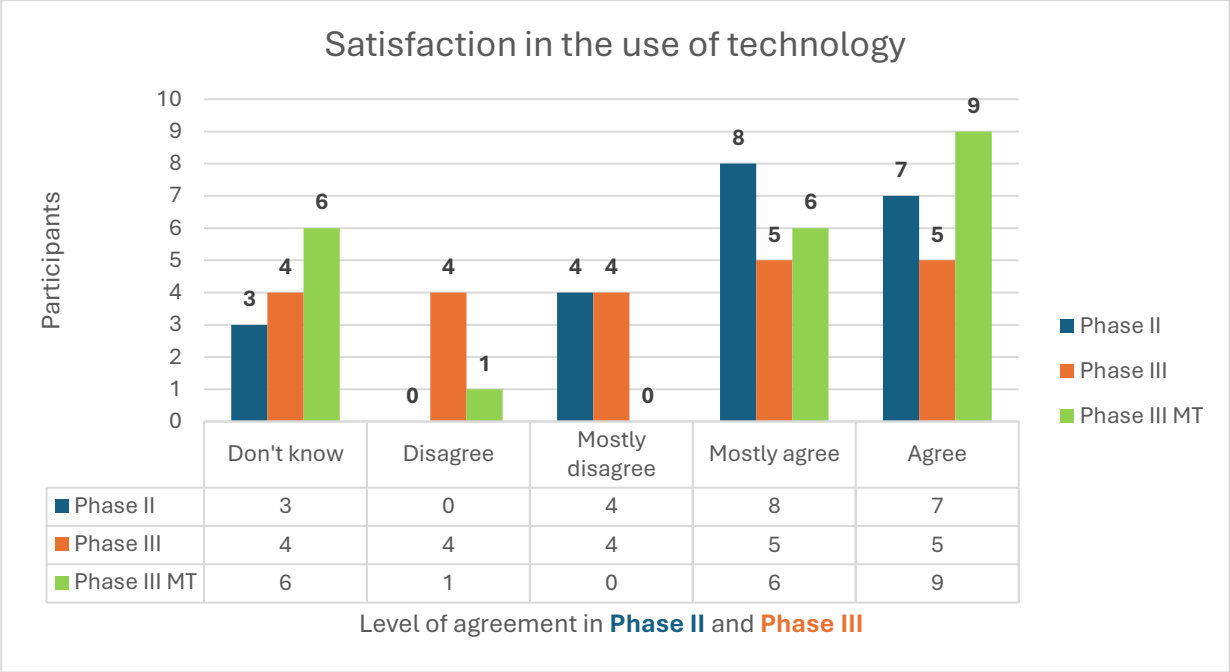


Figure 8.1 Satisfaction in the use of translation technologies in Phase II and Phase III

The graph illustrates the level of agreement with Q28 ("Completing a translation job using learned translation technologies gives me satisfaction") in the second questionnaire and Q8 ("I am very satisfied with the results I have achieved since I started using translation technology") in the third questionnaire. The green line (Phase III MT) represents one of the primary factors that significantly influenced the outcomes, namely the advantages of augmented translation. The green line in this instance refers to those individuals who used TM/TB/MT (as evidenced by Q9 of the third questionnaire, which states, "I find it very useful to have translation memories, glossaries and machine translation in one working environment"). However, as it was not feasible to train the NMT engine for all languages, not all translators were able to use the customised engine, which had a notable impact on the outcomes demonstrated by the orange line. Despite this, 15 participants ultimately benefited from the augmented translation approach, while 10 were satisfied with the results of the research project, given that only the English-Italian and Italian-English engines had been customised. Indeed, the number of participants expressing dissatisfaction with the use of

translation technologies increased from four in the second questionnaire to eight in the third questionnaire.

Figure 8.2 represents the longitudinal perspective of data related to motivation in the use of technology in Phase II (six months after training) and Phase III (end of the research project):

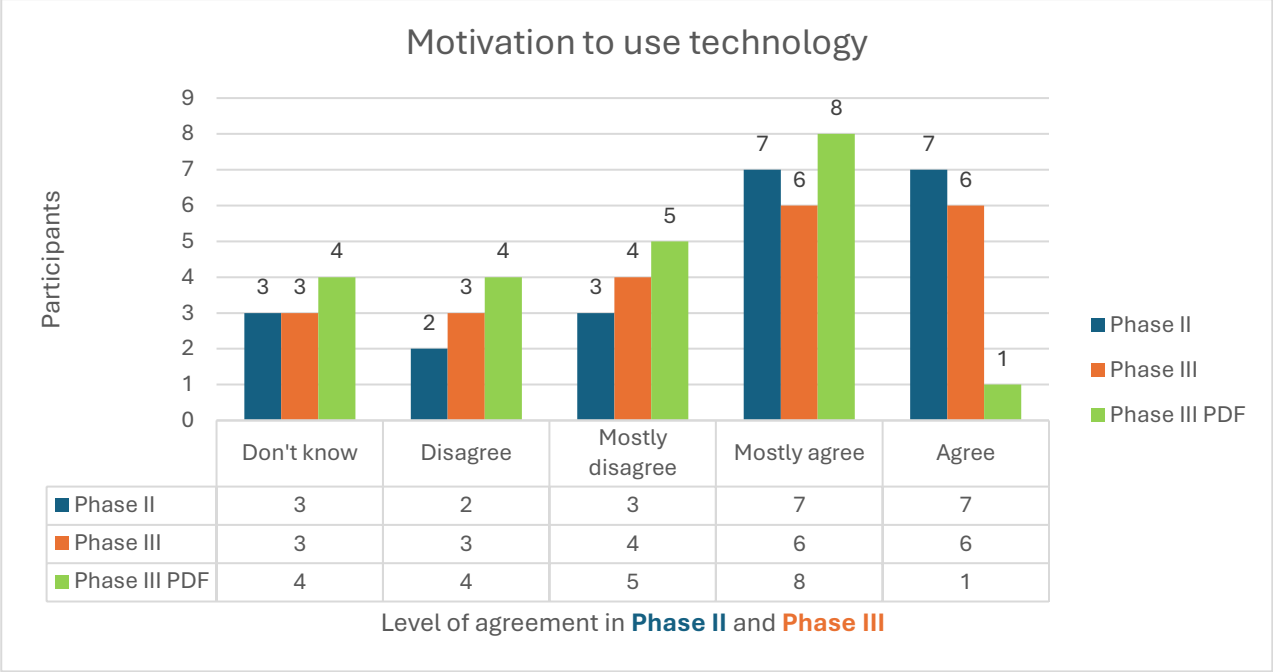


Figure 8.2 Motivation in the use of translation technologies in Phase II and Phase III

The graph illustrates the level of agreement with Q13 ("Now that I have learned how to use translation technologies, I want to deepen my knowledge") in the second questionnaire and Q28 ("The results achieved this year motivate me to use translation technology more and better") in the third questionnaire. In this instance, the green line represents a significant source of demotivation with regard to the utilisation of technology, namely the issue concerning the PDF format (Phase III PDF). The green line is associated with the level of agreement with Q16 ("The problems with converting PDF files demotivated me and I decided not to use translation technology"). The impossibility of resolving the file format issue, coupled with the fact that not all translators were inclined or had the necessary time to modify the formatting in order to prepare files for translation in the CAT, resulted in nine participants expressing a lack of motivation to utilise translation technologies. It is noteworthy that despite the formatting issue, 12 participants continued to utilise translation tools, as they perceived the investment of time in document formatting to be a worthwhile endeavour, given the enhanced capabilities afforded by the translation phase. These participants were sufficiently motivated to introduce this additional step into their traditional workflow.

1.2 What is the impact of non-human actors on the internal network of participants from an ANT perspective?

Over the 12-month period of the fieldwork research, the non-human actors exerted a dual and contradictory influence. At the outset, the non-human actors served to unify the group, yet ultimately proved to be a divisive element as well.

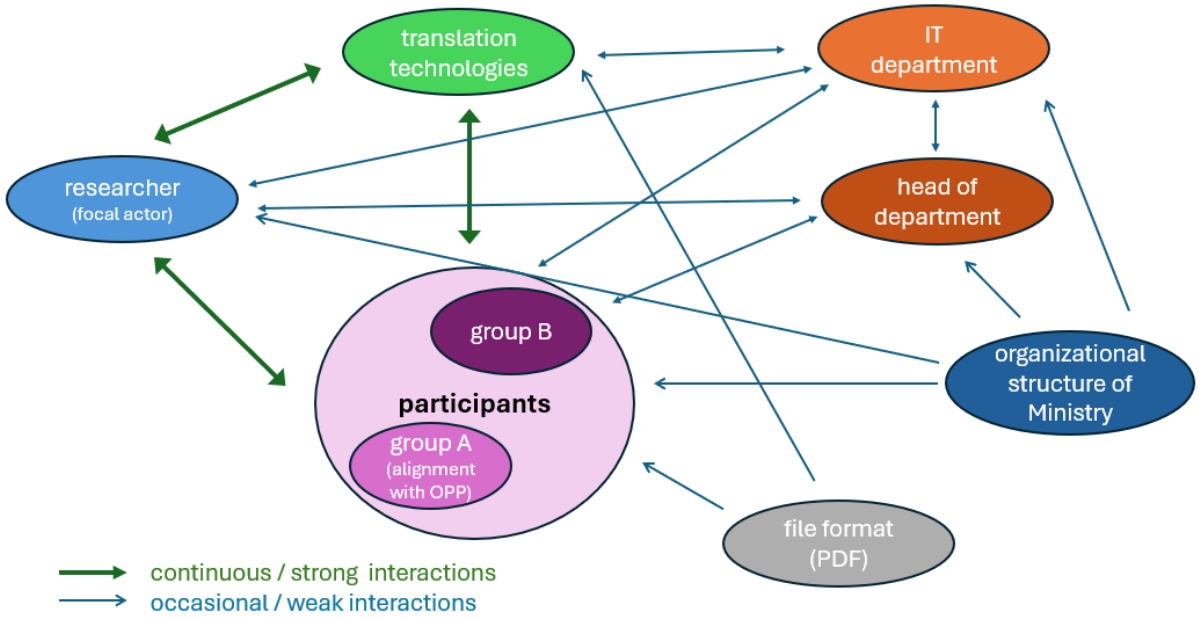


Figure 8.3 Actor-network representation with frequency of interaction between actors in Phase I (training)

In Phase I (Section 6.2) the introduction of translation technologies resulted in the gradual emergence of a team spirit and collaborative approach between participants of the same group that were previously absent at the outset of the research project. The process was gradual and exhibited different characteristics as it evolved across the three phases. In this initial phase, the utilisation of translation tools necessitated the sharing of linguistic resources amongst participants within each group (Group A and Group B, predominantly due to the staggered timing of training) for the enhancement of TMs and TBs as well as the need for reciprocal support in the use of the new tools. All the actors enrolled in the intervention played their role in shaping the translation^{ANT} process through constant dynamic interrelations of the network motivated by the aligned interest inscribed in translation tools.

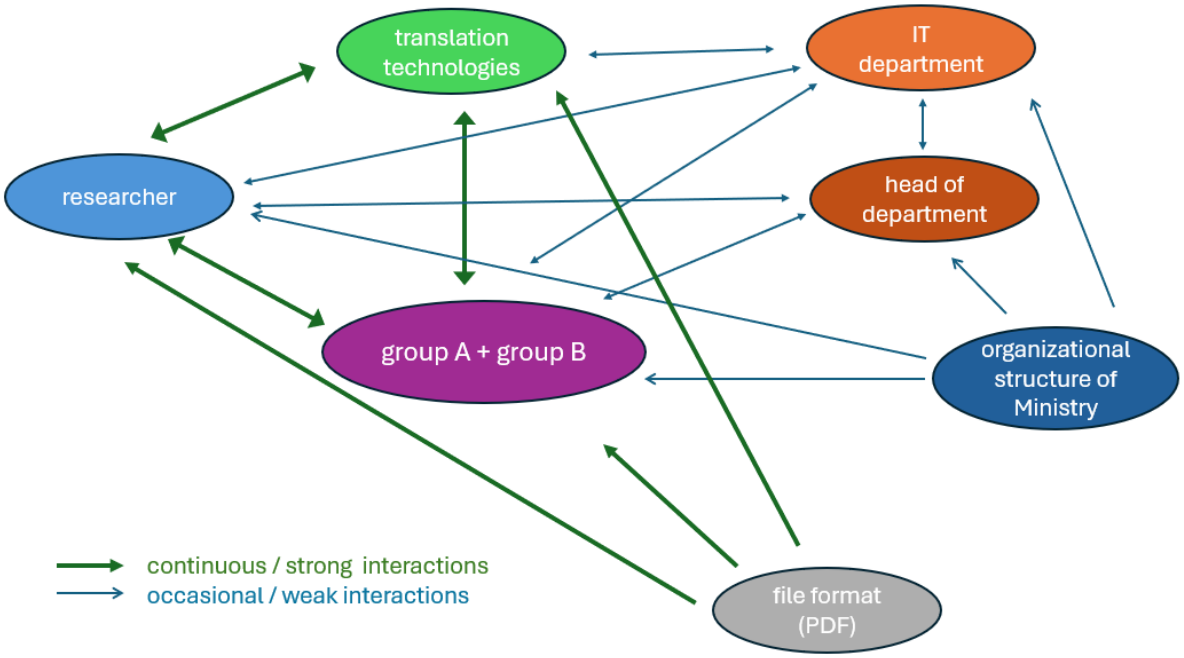


Figure 8.4 Actor-network representation with frequency of interaction between actors in Phase II (mentoring)

In Phase II, the advantages provided by larger TMs/TBs and the necessity to collect a sufficient quantity of words for NMT customisation stimulated collaboration between the two groups. In the course of the mentoring phase, a comprehensive report on the technical issues, predominantly pertaining to file format, was submitted to the IT department and the Head of Department. Concurrently, a shared repository was established, comprising TMs and TBs from both groups. Each member of each group was granted unrestricted access to the repository and was invited to contribute personal materials. During this phase, the file format issues began to exert a substantial influence on the utilisation of translation tools, to the extent that technological advantages were rendered virtually non-existent in some cases. The efficacy of one-to-one meetings in ameliorating technology anxiety, despite the pervasive concern regarding the potential challenges arising from the utilisation of translation tools, was a key observation of the study. The findings indicated that, while these concerns did have a substantial impact on the adoption of the novel workflow, they did not fully preclude the implementation of these changes. Nonetheless, the second questionnaire revealed that approximately half of the participants were at risk of not fulfilling their commitment, which would consequently endanger the stability of the new network. The second interview revealed that, despite the professional curiosity being a motivating factor, the issue concerning the file format was a source of dissatisfaction for the translators, who were awaiting a resolution from the Head of Department.

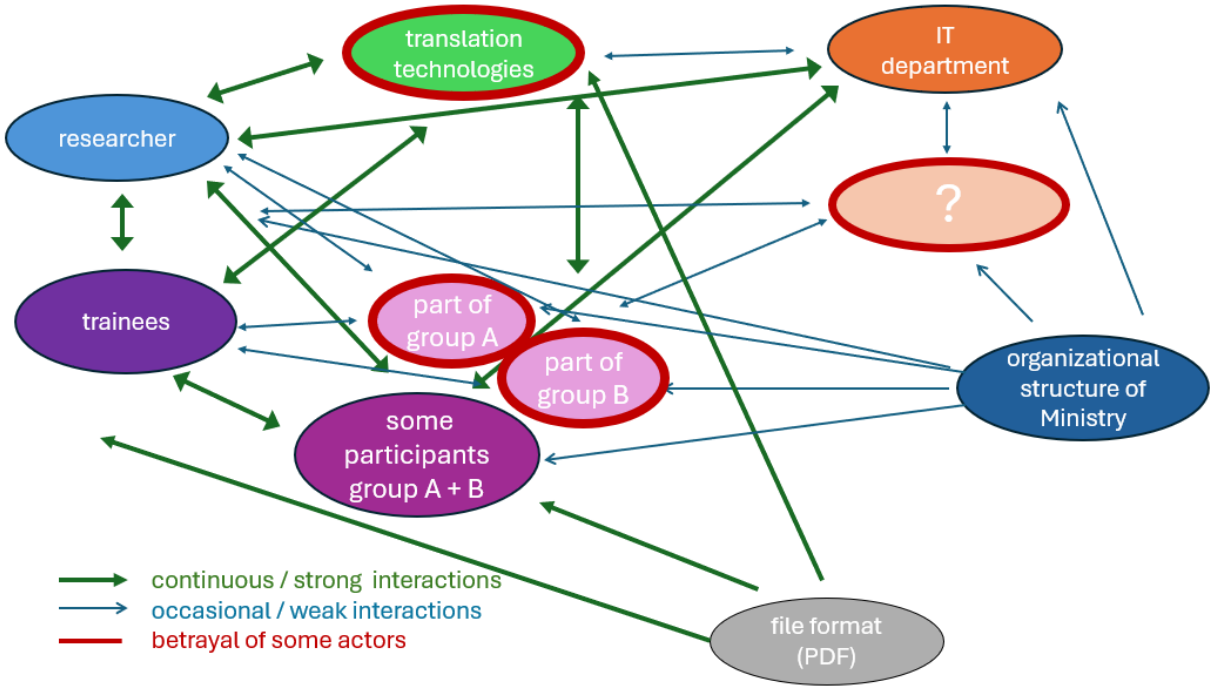


Figure 8.5 Actor-network representation with frequency of interaction and betrayal in Phase III (consulting)

In Phase III, the Head of Department was transferred, resulting in the vacancy of the position for a period, thereby hindering the resolution of the file format issue. Consequently, the translation technologies failed to meet the expectations of the participants (Section 6.2.4), as they were unable to manage all of the files to be translated and did not yield the anticipated outcomes. This file format issue became a contentious matter among the participants, with divergent views emerging on both sides. The translators who were sceptical about the programme's potential assumed the role of observers and betrayed their commitment towards the OPP. Only a subgroup of 12 participants reached the stability of the network and decided to continue using translation tools (submitting a petition to request the acquisition of licenses), driven by the demonstrated potential of translation technologies, even in the legal domain, despite its linguistic and stylistic complexity.

1.3 What is the impact of a participatory/bottom-up approach on the adoption of translation technologies?

The opportunity to engage in the entire process of creating and preparing linguistic resources for the training of NMT, along with the autonomy and capacity for decision-making related to the modalities of implementation and deployment of translation tools, were key outcomes of the participatory approach proposed for this study. The effectiveness of the bottom-up approach was evidenced towards the conclusion of the project, when a subgroup of participants involved the IT department and me in the preparation of a petition to sensitise the Head of Department on the acquisition of program licenses to continue using translation technologies after the completion of the research project. It is important to note, however, that 10 participants opted not to subscribe to the

aforementioned petition. Consequently, while the bottom-up approach supported the action of motivated translators, it had no impact on those who were demotivated.

A bottom-up approach does not appear to be a common practice within the industry with regard to the implementation of IT technologies (see Section 4.11.1). In general, the pursuit of enhanced productivity and economic gains tends to prevail over considerations pertaining to the human factor and the specific requirements of translators. The evaluation of the economic investment required to customize an MT engine, as well as the quality of the trained MT output, is frequently outsourced for reasons including a lack of expertise or resources on the part of the customer, and the desire to reduce time spent on the evaluation process. The advantages of the bottom-up approach in a institutional context with such a specialised type of documentation as legal translation were twofold. Firstly, the evaluation was performed by internal translators (i.e. the most qualified experts to perform such an evaluation), thereby encouraging them to participate actively in the decision-making process regarding new technologies and develop a sense of ownership over the technology being implemented. Secondly, the exclusive use of automatic evaluation was avoided, as this tends not to correlate with human judgement (Kocmi et al., 2021) and requires human reference translations to provide a result. Such an attitude results in greater levels of engagement and commitment to the successful adoption of technologies, fostering a culture where employees are more likely to embrace changes rather than resist them. The bottom-up approach facilitated greater collaboration and communication by engaging participants at all levels, including those in other departments indirectly involved in translation tasks. Translators could share their insights and experiences, leading to more comprehensive discussions about the technology's potential applications and challenges, suggesting solutions tailored on their needs, from their unique perspective, that may not have been considered in a top-down approach. This approach could also potentially solve the job satisfaction paradox of translators (see Section 2.3). Being familiar with day-to-day operations, translators highlighted possible challenges or pitfalls that could not be apparent to upper management. A significant drawback of the bottom-up approach was that the decision-making became prolonged, mainly due to bureaucracy and internal procedures. So, for an optimal implementation, it could be advisable to balance bottom-up insights with top-down strategic oversight.

The second research question too was subsequently divided into three discrete sub-questions:

RQ2*: When considering the attitude towards translation technologies over time:*

2.1 What is the impact of attitude on technology adoption?

Despite the self-reported low level of IT skills demonstrated by 19 participants at the outset of the study, 17 participants believed that translation technologies could be beneficial in speeding up their job and 14 participants stated that they could contribute to enhancing quality. The five participants did not express a clear position on this matter (Section 6.1.1). This may be interpreted as an

indication of a positive attitude towards technology, particularly given that six participants expressed concerns related to IT fear and anxiety. No respondents expressed reservations regarding the potential for such technologies to replace them, but 14 participants expressed concerns that the introduction of translation technologies into existing workflows might prove complex. However, it is worth noting that seven participants agreed to participate in the intervention primarily out of professional curiosity with the intention of enhancing existing work practices without making substantial alterations (Section 6.2.2). This emphasises the pivotal role of a requisite shift in mentality and workflow that influenced their decision not to adopt translation tools. This observation is further supported by the responses of 12 participants who advocated for greater involvement in the project of some reluctant colleagues during the second (Section 6.2.4) and third interviews (Section 6.3). However, as analysed in Section 7.3, for three participants out of six that reported a level of IT fear and anxiety, there is no direct association with the decision not to use technology. In addition, it is also relevant to consider that the data collected at the Ministry of Justice partially confirmed the hypothesis expressed by Dam and Zethsen (2016) that perceptions of the usefulness and threat of technology could differ for public servants on permanent contracts, since they could feel less threatened by translation technologies, as it emerged as one of the reasons for the reluctance of some participants to use translation tools.

2.2 Does training have an impact on attitude?

Section 7.4 presents data pertaining to the influence of training and mentoring on participants' attitudes. The outcomes demonstrated that training and mentoring in translation technologies are crucial to improve participants' attitude towards such technologies, equipping them with the necessary skills to evaluate the relative benefits and drawbacks of such technologies. Furthermore, it enables the identification of an effective balance between trust and control over NMT. Nevertheless, as demonstrated by the responses to the open-ended question included in the final questionnaire, training and mentoring had no observable impact on the attitudes of seven participants. On the other hand, it is noteworthy that in the initial questionnaire, none of the participants expressed concerns about being replaced by translation technologies (Q11). However, in the second questionnaire, three participants voiced such concerns (Q14), and this number increased to five participants in the final questionnaire (Q14). The quality of MT output, coupled with the new awareness acquired through training and mentoring, had a notable impact on the participants' perception of the potential for replacement by MT.

2.3 Does the social dimension influence attitude?

The ANT perspective in the present study revealed the relevance of personal relationships in the introduction of technologies and how they influenced the attitude of participants. The necessity to collaborate and work in a team introduced by the use of TMs and TBs represented the first step towards the emergence of a "team spirit" that supported 15 participants not only from a professional

point of view but also from a personal perspective because they learned in a group, supported and consulted each other to overcome technical difficulties related to the use of translation tools and 12 participants pursued a collective choice in the end to continue using translation technologies. As observed during Phase III, towards the conclusion of the research project, four participants expressed reservations about persuading or sharing outcomes with those who had opted not to utilise translation tools. The answer of P9 is emblematic of this situation "[technologies] created a bit of a pro and con atmosphere in the office. Even with people I care about, respect and love, I find myself having to disagree with their opinions. So, I choose not to talk about it, I avoid it, otherwise it may lead to confrontation".

According to the RQs answers, the impact of self-determination and decision-making on institutional translators' satisfaction (Ehrensberger-Dow and Massey, 2017) had a relevant role (hypothesis 1) and the greater involvement of linguists in all organisational aspects of translations technologies (Cadwell et al., 2018; Sakamoto and Yamada, 2020) (hypothesis 2) was fundamental to retain participants for the whole duration of the fieldwork and motivate them to adopt translation tools also after the completion of the intervention. Data also demonstrated that hypothesis 3, according to which the more translators' technological competences and confidence in the use of translation tools and NMT grow (do Carmo, 2020), the more their attitude towards technology improved (Alvarez-Vidal et al., 2020), can be partially confirmed. Surprisingly, the age and reduced IT skills of participants did not have the expected relevant impact on technology adoption (hypothesis 4), because professional curiosity and personal challenge prevailed as sources of motivation. In contrast, the findings demonstrated that attitudes towards translation technology could exert a significant influence on the stability of the novel network of human and non-human actors that emerged (hypothesis 5). The outcomes also suggested that interest in the project and professional curiosity could facilitate commitment towards the objective of training the NMT engine (hypothesis 6). However, it should be noted that the necessary stability to definitively adopt translation technologies was reached only in a subnetwork that emerged from the original network created at the outset of the study. In fact, the findings demonstrated that human and technological sources of disappointment exerted an equivalent influence on the balance of the actor network (hypotheses 7).

8.2 Contributions of the research

The first novelty of this study was to assess the impact of a participatory approach to the implementation of translation technologies in an institutional environment from the outset, investigating the influence on translators' sources of satisfaction and motivation, and evaluating the relevance of attitude. The second novelty of this study was to explore the main factors identified as elements that could influence the adoption and diffusion of translation technologies among professional translators in a complex organisation like a ministry adopting a participatory/bottom-up approach. The third novelty of this study is the use of the ANT framework to analyse the various roles

played by the researcher throughout the three phases of the current research. This involves transitioning from an outsider in the first phase, to an advisor/insider in the second phase, and ultimately becoming a passionate participant/betweener in the third phase as consultant (Milošević and Risku, 2020).

From an empirical perspective, the present study was the opportunity to provide a potential solution to one of the main issues related to the use of translation technologies, that is the question of how to introduce them in a complex work environment (Section 5.6). The involvement of translators in all stages of the process pertaining to the collection and preparation of linguistic data for NMT engine training, as well as the evaluation of the customised NMT engine, has the potential to yield more reliable and high-quality results for the organisation, particularly in contexts characterised by stringent security and reservation requirements.

From a theoretical perspective, in the context of a ministry or similar entities characterised by a complex organisational structure, the combination of a multiphase approach with the ANT framework provides a valid tool and a useful vocabulary to monitor all the actors involved, evaluate the effectiveness of the action or intervention planned, map the role of human and non-human actors in relation to the goal to be reached and detect the emergence of any potential issue (or betrayal) that could disrupt or impair the aim for which the actor network was created. Additionally, ANT facilitates the inclusion of the researcher as an actor within the network, thereby enabling reflexivity and self-monitoring. This process serves to mitigate potential biases in data collection and interpretation arising from an insider status and favour the identification of areas that would benefit from further investigation from an outsider perspective. Furthermore, in instances of technological innovation or the integration of tools within the workplace, evaluating the impact of novel technologies from the perspective of the actor-network facilitates the consideration of both the technical and social dimensions. This approach enables the identification of the relevance of the human factor and elements that could impede the correct implementation, in addition to factors strictly linked to the specific characteristics of technology itself. In such circumstances, the multiphase approach gives researchers the flexibility to adjust or amend the research plan as necessary, for instance, to mitigate the risk of participants opting out (particularly in long-term projects).

From an educational perspective, the alternation of training, mentoring and consulting (Section 4.7.1) proved to be a powerful approach to training professional translators on the job without interrupting their daily activities while providing them with incremental skills and favouring their autonomy at the same time. The combination of such interventions enables the researcher to operate at both the group and individual levels, thereby acquiring a dual perspective on the social dimension. In particular mentoring can be beneficial in similar context for different reasons: help the researcher to observe from an insider perspective the way each participant works, as well as to gain a more in-depth understanding of the work environment and its social dimension; verify the effect of the training

delivered and reinforce it if necessary; facilitate the integration of the skills acquired by the participant in their daily activity, adapting them to the specific needs or abilities of the translator; and take advantage of the professional experience of the participants to enhance the use of translation technologies. However, the undertaking of mentoring demands a considerable investment of time and energy from the researchers, necessitating the establishment of a personal relationship with the participants and exposing them to a significant degree of emotional involvement. This dynamic could transcend the boundaries between the personal and professional dimensions, thereby placing the personal aspect of the teacher at the forefront, superseding that of the researcher. The use of analytic memos (or a diary), reflexivity, and the engagement with fellow researchers (or supervisors) demonstrated to be effective mechanisms in mitigating the potential disadvantages associated with adopting a native perspective in such contexts. Furthermore, the opportunity to rely on a network of professionals and experts in the sector under investigation could be advantageous in the event of technical difficulties or unexpected results.

In view of the experience gained from this research, in addition to liasing with other colleagues that performed similar studies (e.g., I had the opportunity to discuss the outcomes of the introduction of translation technologies with the colleagues of the Bank of Italy), it may be beneficial to become more acquainted with the working environment in which the research will be conducted and to arrange a few introductory meetings with the future participants. This would allow for the acquisition of information regarding the internal organisational structure of the entity, the participants' initial competencies, and the social dynamics of the working group. In any case, when preparing the questionnaires or interview questions, it would be advisable to prepare small variations of the same question or statement in order to be ready to make adjustments during the various stages of the project according to the results obtained from the analysis of the quantitative or qualitative data collected in each phase, always keeping a global and uniform perspective of the planned research project. In addition, it would be advisable to adapt the instruments and methods chosen to perform research in accordance with the characteristics of the environment and participants under investigation. For example, instead of recording the voices of participants during interviews (if they do not consent to the recording), transcribing them, and then submitting them to participants for validation, it could be useful to use speech-to-text software so that participants can evaluate immediately what will be recorded about their opinion and provide their approval contextually. This approach would eliminate the need for a very time-consuming activity. Furthermore, if it is not possible to arrange focus groups (for logistical reasons or due to the reluctance of participants), the training activities performed in groups could be exploited as a favourable moment to exchange ideas and gather useful information about group dynamics planning a final part at the end of the training session to elicit opinions and suggestions from the participants.

8.2.1 Transforming workplace research challenges into opportunities: the role of the researcher in the present study

Scholars have emphasised the significance of studying translation processes in their actual environment. This involves focusing on the perspectives, emotions, and views of translators (Christensen, 2011; Hubscher-Davidson, 2011;Sun, 2014; Angelone, Ehrensberger-Dow, and Massey, 2016). Risku (2017, p. 294) claims, however, that there are so few workplace research projects that they can be considered "pioneering work – probing the method while studying the object" (Risku, 2017, p. 294), particularly because of the challenges they pose.

Workplace research in TS presents several challenges, including finding suitable and willing translation settings to study, understanding the different motivations of individual participants, and addressing issues related to the anonymity, role, and motivation of the observed individuals and institution. Furthermore, it is crucial to recognise the inherent difficulties associated with conducting empirical research in a workplace setting. This is due to the fact that social quality (Abdallah, 2016) or emotion (Hubscher Davidson, 2018) cannot be controlled in such an environment. In the present study some elements in particular exerted considerable influence on the research design (e.g. the delays in the approval process, the technical limitations emerged during the project that limited the functionalities of the tools adopted, the change in the Head of Department etc.), that could have potentially limited the scope of the project, but that proved to be a further opportunity to test the variables under investigation because the spontaneous alteration that occurred within the network would have been challenging to induce in a non-laboratory setting.

The perspective of the present research is somewhat 'reversed' compared to that of the study carried out by Milošević and Risku (2020), because “attitudes and behaviour of the people observed […], and their levels of satisfaction with their own work situation, position and autonomy” (ibid, p. 125) are collaterals to their study, whereas here they are the focus elements under investigation as sources of satisfaction and motivation. Furthermore, the aim of this study was to introduce a change in the workplace where the research was performed, and participants had some expectations about the results and potential outcomes of the research. The researcher was not perceived as an outsider who is “remote from practice” (ibid, p. 125), because the researcher and the majority of participants had a common goal to achieve (the introduction of translation technologies in the translation department), while the stated aim of the research (i.e., to analyse sources of satisfaction, motivation, and attitude in relation to translation technologies) was of minor importance to the participants.

In Phase I, I had the role of trainer and professional consultant, a professional with skills different from those of the participants (i.e., the researcher is not considered a translator), skills that could trigger the expected change. This helped me to acquire a recognised role as an additional member of the group working towards a common goal. One of the issues to be overcome was the negative perception of the technology by some participants, and the common goal represented a great source of motivation for these participants to overcome this obstacle. An important element that helped to create a climate of trust and mutual commitment was the pre-existing relationship I had with three of

the participants (university colleagues, different context, different roles), and the fact that Group A was the promoter of the change (they helped me to gain access to the Ministry).

In Phase II, I was still a trainer and a professional consultant, but the working conditions were different: some participants started manifesting a certain level of resistance and they perceived me more as an outsider, a temporary presence that would have disappeared at the end of the intervention (and this was demonstrated by their lack of availability for the mentoring).

In Phase III, there was a significant change: various heads of department were substituted. I had to exploit the positive relationships built up with other staff members inside the Ministry to once again submit the research project for approval. The participants were not in a position to take immediate action in this situation, as they had to await the formal appointment of the new head of department. Consequently, I was obliged to circumvent them and rely on internal alliances with the IT department and other heads of department's collaborators that had been established over the preceding months. Some participants in Group B decided not to use the translation technologies any further in view of the uncertain situation but were open to the possibility of observing and participating passively, waiting for further developments. This was identified as a significant demotivating factor, triggering an internal conflict within both Group A and Group B. Furthermore, it was noted that there was a division amongst the groups themselves: on the one hand were those who wished to continue and accomplish the goal set, and on the other were those who advocated for the maintenance of the customary approach to translation, which had been employed previously. I became a mediator and used the presence of the trainees and the coaching opportunity to try to motivate the participants still involved in the research and help them to overcome personal relationship problems for the sake of the success of the research project. A mediator not only to overcome internal conflicts, but also to help them exercise their agency and become promoters of change beyond the end of the research (i.e. one of the outcomes of the bottom-up approach), providing them with the positive results of the intervention and an accurate report of the project that could support the acquisition of program licenses.

The role of the researcher is not the focus of the present research, but it is an example of the new trends in TS research and the potential of methodological approaches that combine different approaches. This study hinged upon the formation of interpersonal relationships and the creation of new alliances through the *interessement* of other actors external to the network of linguists to achieve a common goal. This served to reinforce the relevance of the sociological perspective that are gradually being applied in TS in a situated perspective: "the field of ethnographic and workplace studies seems to be gradually developing into a coherent new sub-sector of translation research" (Milošević and Risku, 2020, p. 112).

8.2.2 Peculiarities of the present study and advantages of the collaboration between academia and institutions

Conducting workplace research often requires substantial resources, including time, funding, and access to technology. Organisations may be reluctant to allocate resources for research purposes, especially if they perceive limited direct benefits. This research project constituted a kind of "protected space" that was able to move freely between the different actions to be taken in order to progress the intervention. This allowed participants to exit at any time without any risk of harm or damage being done to them. One of the additional advantages of this approach was that it facilitated a "fast track" for aspects such as training meetings or technical issues in the context of a ministry where bureaucracy is a predominant element that impacts on the implementation of new processes. Finally, it required only the investment of time and personal commitment to the action that each person preferred.

The Ministry was not required to make any economic investment, nor was the daily work of linguists disrupted. Consequently, the expectations of managers were relatively modest, and the introduction of translation technologies into the working environment was already a result in itself. One of the challenges in such circumstances was to ensure that the timing and requirements of the research did not become overly influenced by those of the Ministry. Furthermore, adherence to the research plan, which had been devised prior to the commencement of fieldwork, proved challenging, particularly in relation to data collection. One significant challenge of workplace research is not only the difficulty in recruiting participants, but also maintaining their involvement throughout the study. This is particularly the case when the specific interest of participants diverges from that of the researcher, as was the case in my specific study. In such instances, translators may not see the immediate benefits of participating in research, which can lead to high attrition rates and compromise the quality and completeness of the data collected. Moreover, the very factors that initiate change may also disrupt the internal balance of personal relationships, giving rise to sources of internal conflict. The impact of such an event is particularly pertinent in a bottom-up approach, given the potential for the researcher to be involved on a personal level. Incorporating such an event into the design of the research project could prove beneficial in minimising the potential for disruption to the project.

Another expected outcome of the present research was to highlight the importance of field research in the Departmental environment, with the aim of bringing about change. This study could serve as a model for collaboration between universities and complex organisations (such as ministerial entities) with the goal of facilitating technological innovation through the implementation of research projects. However, in the event that the objective of a workplace research project is not merely observation but also the implementation of changes of any kind, a potential solution could be to attempt to align the research interest with that of the participants from the outset of the research project.

8.3 Limitations of the study

As reported in Section 8.2.1, workplace research involves major development and implementation challenges. In addition to the aforementioned issues, the need to protect information related to the Ministry of Justice and the participants, as well as the necessity to use research instruments to collect data related to the RQs that could comply with internal reservation regulations and do not impact the daily activities of the translators played an important role in the design and implementation of the project. Conversely, it was essential to implement procedures and instruments that could ensure the ecological validity of the study and facilitate its replicability, despite the fact that the particularities of the Ministry of Justice and their idiosyncratic processes have an adverse effect on the transferability of the study. Furthermore, there was a general lack of control, which at times jeopardised the progress of the study and limited the customisation of the NMT engine to the English-Italian and Italian-English combinations.

By studying translators in their natural work environments, it was possible to investigate how translators adapt their skills to different contexts could facilitate the development of training programmes that are more closely aligned with industry requirements. However, the diversity of workplace settings means that findings from one context cannot be assumed to be generalisable to others. The distinctive cultures, workflows and technologies of different organisations exert a considerable influence on translation practices, thereby rendering it challenging to draw broad conclusions from specific studies. This variability necessitates the adoption of flexible methodologies that can accommodate different contexts. The MMR approach permitted a certain degree of transferability, despite the limited number of participants, the distinctive characteristics of the individuals from a professional perspective, and the institutional context of the Ministry, which presented an unexpected opportunity for further project development.

8.4 Implications for future research

One of the outcomes of the present research is that a year after it finished, the Ministry of Justice purchased the licenses for the programs proposed during the project and it is arranging an internal development group to further deploy translation technologies. The objective is to undertake a new research project promoted with the help of the 12 participants who signed the petition with the aim of modifying the internal workflow of translation processes. This will be achieved by employing translation technologies not only to enhance the activities of in-house translators and improve NMT engine customisation for all language combinations, but also to exert greater control over outsourced translations. In order to achieve this objective, one of the translators who retired this year in June was replaced by a translator who is experienced not only in the use of CAT tools, but also in project management. Moreover, the management of terminology will be enhanced not only through the optimisation of ad hoc glossaries (e.g. the utilisation of tools such as SketchEngine), but also through the exploitation of the potential of a new plug-in released with Trados Studio 2024 that integrates AI into the work environment with TMs, TBs and NMTs.

In addition, I was involved with some of the participants in the dissemination of the outcomes of the study to the translators of the DIA (Anti-Mafia Investigation Division) and the Ministry of Interior who are interested in collaborating with the Ministry of Justice for the creation of a customised NMT system for ministerial purposes. The director of the DIA, in particular, asked us to share our experience with the translators of his department because he wanted to replicate the bottom-up approach proposed in the present study. Only after receiving the approval of the internal translators did he decide to promote the project and now we are in the phase of arranging the next steps.

The findings of this research also indicate the necessity for further investigation in a number of areas. A combined approach, integrating a participatory approach with ANT, could prove beneficial in investigating the positionality of researchers in the planning of future training programmes on translation technologies within an institutional context. Furthermore, it would be advantageous to ascertain the value of training and mentoring in the rapid and effective implementation of translation tools, particularly in contexts where IT skills are limited. As demonstrated in the intervention, limited IT skills may prove disadvantageous insofar as they necessitate a greater investment of time in the implementation of translation technologies, which may require a more substantial commitment of resources during the training phase. Conversely, they may represent an advantage in the design of procedures and solutions that are tailored to the specific needs of translators and their work environment, leveraging the feedback provided by participants as the research project progresses.

References

Abdallah, K. (2010) 'Translator's agency in production networks', in T. Kinnunen and K. Koskinen (eds.) *Translator's agency*. Tampere: Tampere University Press, pp. 11–46.

Abdallah, K. (2011) 'Towards empowerment', *The Interpreter and Translator Trainer*, 5, pp. 129–154.

Abdallah, K. (2012) *Translators in production networks: reflections on agency, quality and ethics*. PhD thesis. University of Eastern Finland.

Abdallah, K. (2014) 'The interface between Bourdieu's habitus and Latour's agency: the work trajectories of two Finnish translators', in G. M. Vorderobermeier (ed.) *Remapping habitus in translation studies*. Amsterdam: Brill, pp. 111–132.

Abdallah, K. (2016) 'Social quality: an integral aspect of sustainability in (organizational) ergonomics', presented at the *Interdisciplinary Perspectives on Sustainability* workshop, University of Vaasa.

Abdallah, K. (2017) 'Three-dimensional quality model: the focal point of workflow management in organisational ergonomics', presented at *Translating and the Computer 39*, AsLing.

Ajzen, I. (1991) 'The theory of planned behavior', *Organizational Behavior and Human Decision Processes*, 50, pp. 179–211. doi: 10.1016/0749-5978(91)90020-T.

Alotaibi, H. M. (2014) 'Teaching CAT tools to translation students: an examination of their expectations and attitudes', *Arab World English Journal*, pp. 365–374.

Alvarez-Vidal, S., Oliver, A. and Badia, T. (2020) 'Post-editing for professional translators: cheer or fear?', *Tradumàtica: Tecnologies de La Traducció*, 18, pp. 49–69.

Angelelli, C. V. (2012) 'Introduction', in C. V. Angelelli (ed.) *The sociological turn in translation and interpreting studies*. Amsterdam: John Benjamins, pp. 1–5.

Arnejšek, M. and Unk, A. (2020) 'Multidimensional assessment of the eTranslation output for English–Slovene', *Proceedings of the 22nd Annual Conference of the European Association for Machine Translation*. Lisboa: European Association for Machine Translation, pp. 383–392. Available at: https://aclanthology.org/2020.eamt-1.41 (Accessed: 07/10/2024).

Atkinson, D. P. (2012) *Freelance translator success and psychological skill: a study of translator competence with perspectives from work psychology*. PhD thesis. University of Auckland. Available at: https://researchspace.auckland.ac.nz/bitstream/handle/2292/18723/whole.pdf (Accessed: 07/10/2024).

Bandura, A. (1986) *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (2001) 'Social cognitive theory: an agentic perspective', *Annual Review of Psychology*, 52, pp. 1–26. doi: 10.1146/annurev.psych.52.1.1.

Bane, F. and Zaretskaya, A. (2021) 'Selecting the best data filtering method for NMT training', *Proceedings of Machine Translation Summit XVIII: Users and Providers Track*, pp. 89–97. Association for Machine Translation in the Americas.

Bardi, A. and Schwartz, S. H. (2003) 'Values and behavior: strength and structure of relations', *Personality and Social Psychology Bulletin*, pp. 1207–1220.

Baron, L. and Gomez, R. (2016) 'The associations between technologies and societies: the utility of actor-network theory', *Science, Technology and Society*, 21, pp. 129–148.

Beikian, A., Ketabi, S. and Hesabi, A. (2019) 'Translation technology tools and professional translators' attitudes toward them', *Iranian Journal of Applied Language Studies*, 11(2), pp. 57–80.

Braun, V. and Clarke, V. (2019a) 'Reflecting on reflexive thematic analysis', *Qualitative Research in Sport, Exercise and Health*, 11(4), pp. 589–597.

Braun, V. and Clarke, V. (2019b) 'To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales', *Qualitative Research in Sport, Exercise and Health*, pp. 1–16.

Braun, V. and Clarke, V. (2006) 'Using thematic analysis in psychology', *Qualitative Research in Psychology*, 3(2), pp. 77–101.

Braun, V. and Clarke, V. (2013) *Successful qualitative research: a practical guide for beginners*. London: Sage.

Braun, V. and Clarke, V. (2016) '(Mis)conceptualising themes, thematic analysis and other problems with Fugard and Potts (2015) sample-size tool for thematic analysis', *International Journal of Social Research Methodology*, 19(6), pp. 739–743.

Braun, V. and Clarke, V. (2020a) 'One size fits all? What counts as quality practice in (reflexive) thematic analysis?', *Qualitative Research in Psychology*. doi: 10.1080/14780887.2020.1769238.

Braun, V. and Clarke, V. (2020b) 'Can I use TA? Should I use TA? Should I not use TA? Comparing reflexive thematic analysis and other pattern-based qualitative analytic approaches', *Counselling and Psychotherapy Research*, 21(1), pp. 37–47.

Briva-Iglesias, V. and O'Brien, S. (2023) 'Measuring machine translation user experience (MTUX): a comparison between AttrakDiff and user experience questionnaire', *Proceedings of the 24th Annual Conference of the European Association for Machine Translation*, pp. 335–344. Tampere: European Association for Machine Translation.

Brooke, J. (1996) 'SUS – A quick and dirty usability scale', in P. W. Jordan et al. (eds.) *Usability evaluation in industry*. London: Taylor & Francis, pp. 189–194.

Brown, J. S., Collins, A., & Duguid, P. (1989). 'Situated cognition and the culture of learning'. *Educational Researcher*, 18(1), 32–42

Brunette, L. and O'Brien, S. (2011) 'Quelle ergonomie pour la pratique postéditrice des textes traduits?', *ILCEA Revue*, 14.

Bryman, A. (2012) *Social research methods*. 4th edn. Oxford: Oxford University Press.

Bundgaard, K. (2017) *(Post)-editing: a workplace study of translator-computer interaction at Text Minded Danmark A/S*. PhD thesis. University of Aarhus.

Buzelin, H. (2005) 'Unexpected allies: how Latour's network theory could complement Bourdieusian analyses in translation studies', *The Translator*, 11(2), pp. 193–218.

Buzelin, H. (2011) 'Agents of translation', in Y. Gambier and L. van Doorslaer (eds.) *Handbook of translation studies: Volume 2*. Philadelphia: John Benjamins, pp. 6–12.

Cadwell, P., Castilho, S., O'Brien, S. and Mitchell, L. (2016) 'Human factors in machine translation and post-editing among institutional translators', *Translation Spaces*, 5(2), pp. 222–243.

Cadwell, P., O'Brien, S. and Teixeira, C. S. C. (2018) 'Resistance and accommodation: factors for the (non-)adoption of machine translation among professional translators', *Perspectives*, 26(3), pp. 301–321. doi: 10.1080/0907676X.2017.1337210.

Callon, M. (1986) 'The sociology of an actor-network: the case of the electric vehicle', in M. Callon, J. Law and A. Rip (eds.) *Mapping the dynamics of science and technology*. London: Macmillan, pp. 19–34.

Callon, M. and Latour, B. (1981) 'Unscrewing the Big Leviathan: How actors macrostructure reality and how sociologists help them to do so', in K.D. Knorr-Cetina & A.V. Cicoure (eds.) *Advances in social theory and methodology: toward an integration of micro- and macro-sociologies*. London: Routledge and Kegan Paul.

Canfora, C. and Ottmann, A. (2020) 'Risks in neural machine translation', *Translation Spaces*, 9(1), pp. 58-77.

Carroll, N. (2014) 'Actor-network theory: a bureaucratic view of public service innovation'. doi: 10.4018/978-1-4666-6126-4.ch007.

Carroll, N., Whelan, E. and Richardson, I. (2012) 'Service science – an actor network theory approach', *International Journal of Actor-Network Theory and Technological Innovation*, 4(3), pp. 51–69. doi: 10.4018/jantti.2012070105.

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J. and Neville, A.J. (2014) 'The use of triangulation in qualitative research', *Oncology Nursing Forum*, 41(5), pp. 545-547.

Castilho, S. and Guerberof Arenas, A. (2018) 'Reading comprehension of machine translation output: What makes for a better read?', in J.A. Pérez-Ortiz, F. Sánchez-Martínez, M. Esplà-Gomis, M. Popović, C. Rico, A. Martins, J. Van den Bogaert and M.L. Forcada (eds.) *Proceedings of the 21st annual conference of the European Association for Machine Translation (EAMT)*. EAMT, pp. 79–88.

Cheek, J. (2004) 'At the margins? Discourse analysis and qualitative research', *Qualitative Health Research*, 14(8), pp. 1140-1150. doi: 10.1177/1049732304266820.

Cheng, S. (2017) *Translation competence development among learners: a problem-solving perspective*. PhD thesis. The University of Manchester.

Christensen, T. P. (2011). Studies on the mental processes in translation memory-assisted translation: The state of the art. Trans-Kom, 4(2), 137–160.

Chyung, S.Y., Barkin, J.R. and Shamsy, J.A. (2018) 'Evidence-based survey design: the use of negatively worded items in surveys', *Performance Improvement*, 57(3), pp. 16–25.

Clark, A. (1997). Being There: Putting Brain, Body, and World Together Again. Cambridge, MA: MIT Press

Cohen, L., Manion, L. and Morrison, K. (2007) *Research methods in education*. London: Routledge.

Corden, A. and Millar, J. (2007) 'Qualitative longitudinal research for social policy - Introduction to themed section', *Social Policy and Society*, 6(4), pp. 529-532.

Córdoba Serrano, M.S. (2020) 'Actor-network theory (ANT)', in M. Baker and G. Saldanha (eds.) *Routledge encyclopedia of translation studies*. 3rd edn. Oxon: Routledge, pp. 5-10.

Courtney, J. and Phelan, M. (2019) 'Translators' experiences of occupational stress and job satisfaction', *Translation & Interpreting*, 11(1), pp. 100-113. Available at: http://www.trans-int.org/index.php/transint/article/view/848 (Accessed: 07/10/2024).

Cravo, A.J. and Neves, J. (2007) 'Action research in translation studies', *Journal of Specialised Translation*, 7, pp. 92–107.

Cresswell, K. (2019) 'Using actor-network theory to study health information technology interventions', *Studies in Health Technology and Informatics*, 263, pp. 87-97.

Cresswell, K., Worth, A. and Sheikh, A. (2011) ‘Implementing and adopting electronic health record systems: how actor-network theory can support evaluation’, *Clinical Governance: An International Journal*.

Cresswell, K.M., Worth, A. and Sheikh, A. (2010) ‘Actor-network theory and its role in understanding the implementation of information technology developments in healthcare’, *BMC Medical Informatics and Decision Making*, 10(67). doi: 10.1186/1472-6947-10-67.

Creswell, J.W. (2007) *Qualitative inquiry and research design: choosing among five approaches*. 3rd edn. Thousand Oaks, CA: Sage Publications.

Creswell, J.W. (2009) *Research design: qualitative, quantitative, and mixed methods approaches*. 3rd edn. Thousand Oaks, CA: Sage Publications.

Creswell, J.W. (2015a) *A concise introduction to mixed methods research*. London: Sage Publications Ltd.

Creswell, J.W. (2015b) ‘Revisiting mixed methods and advancing scientific practices’, in S. Hesse-Biber and R.B. Johnson (eds.) *The Oxford handbook of multimethod and mixed methods research inquiry*. New York: Oxford University Press, pp. 61-71.

Creswell, J.W. and Plano Clark, V.L. (2006) *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Creswell, J.W. and Plano Clark, V.L. (2011) *Designing and conducting mixed methods research*. 2nd edn. Thousand Oaks, CA: Sage.

Creswell, J.W. and Plano Clark, V.L. (2018) *Designing and conducting mixed methods research*. 3rd edn. Thousand Oaks, CA: Sage.

Daems, J. and Macken, L. (2019) ‘Interactive adaptive SMT versus interactive adaptive NMT: a user experience evaluation’, *Machine Translation*, 33(1–2), pp. 117–134. doi: 10.1007/s10590-019-09230-z.

Dam, H.V. and Zethsen, K.K. (2008) 'Translator status – a study of Danish company translators', *The Translator*, 14(1), pp. 71–96.

Dam, H.V. and Zethsen, K.K. (2009) 'Who said low status? A study on factors affecting the perception of translator status', *The Journal of Specialised Translation*, 12, pp. 2–36.

Dam, H.V. and Zethsen, K.K. (2010) 'Translator status – helpers and opponents in the ongoing battle of an emerging profession', *Target*, 22(2), pp. 194–211.

Dam, H.V. and Zethsen, K.K. (2011) 'The status of professional business translators on the Danish market: a comparative study of company, agency, and freelance translators', *Meta: The Translators' Journal*, 56(4), pp. 976–997.

Dam, H.V. and Zethsen, K.K. (2012) 'Translators in international organizations: a special breed of high-status professionals? Danish EU translators as a case in point', *Translation and Interpreting Studies*, 7(2), pp. 211–232.

Dam, H.V. and Zethsen, K.K. (2016) 'I think it is a wonderful job: on the solidity of the translation profession', *Journal of Specialised Translation*, (25), pp. 174-187.

De Jong, E. (1999) 'The impact of motivation on the career commitment of Dutch literary translators', *Poetics*, 26(5–6), pp. 423–437.

Delamont, S. and Atkinson, P. (2018) 'The ethics of ethnography', in R. Iphofen and M. Tolich (eds.) *The SAGE handbook of qualitative research ethics*. London: SAGE, pp. 119–132. doi: 10.4135/9781526435446.

Delaney, Y., McCarthy, J. and Beecham, S. (2017) *Convergent parallel design mixed methods case study in problem-based learning*. Kidmore End: Academic Conferences International Limited.

Dewey, J. (1929) *The quest for certainty*. In J. Boydston (ed.) (1988) *The later works: 1925-1953*, vol. 4. Carbondale: Southern Illinois University Press.

Dhillon, J.K., and Thomas, N., (2019). Ethics of engagement and insider-outsider perspectives: issues and dilemmas in cross-cultural interpretation. *International journal of research & method in education*, 42 (4), 442–453. doi:10.1080/1743727X.2018.1533939.

Diedrich, A. and Guzman, G. (2015) 'From implementation to appropriation: understanding knowledge management system development and introduction as a process of translation', *Journal of Knowledge Management*, 19(6), pp. 1273–1294. doi: 10.1108/JKM-02-2015-0055.

Diefendorff, J.M. and Chandler, M.M. (2011) 'Motivating employees', in S. Zedeck (ed.) *APA handbook of industrial and organizational psychology*. Washington DC: American Psychological Association, pp. 65–135.

Diefendorff, J.M., Megan, E.K., Faith, C.L. and Linh, K.N. (2022) 'Work motivation', in *Oxford research encyclopedia of psychology*. Available at: https://doi.org/10.1093/acrefore/9780190236557.013.37 (Accessed: 07/10/2024).

Do Carmo, F. (2020) 'Time is money and the value of translation', *Translation Spaces*, 9(1), pp. 35–57. doi: 10.1075/ts.00020.car.

Doherty, S., O'Brien, S. and Carl, M. (2010) 'Eye tracking as an MT evaluation technique', *Machine Translation*, 24(1), pp. 1–13.

Doyle, L., Brady, A. and Byrne, G. (2016) 'An overview of mixed methods research – revisited', *Journal of Research in Nursing*, 21, pp. 623–635.

Drugan, J. (2014) 'Top-down or bottom-up: what do industry approaches to translation quality mean for effective integration of standards and tools?', in *Proceedings of Translating and the Computer 36*. London: AsLing.

Dul, J., Bruder, R., Buckle, P., Carayon, P., Falzon, P., Marras, W.S., Wilson, J.R. and van der Doelen, B. (2012) 'A strategy for human factors/ergonomics: developing the discipline and profession', *Ergonomics*, 55(4), pp. 377–395. doi: 10.1080/00140139.2012.661087.

Eagly, A.H. and Chaiken, S. (1995) 'Attitude strength, attitude structure, and resistance to change', in R.E. Petty and J.A. Krosnick (eds.) *Attitude strength: antecedents and consequences*. Hillsdale, NJ: Lawrence Erlbaum Associates Inc., pp. 413–432.

Ehrensberger-Dow, M. (2014) 'Challenges of translation process research at the workplace', *MonTI*, Special Issue 1, pp. 355–383.

Ehrensberger-Dow, M. and Massey, G. (2017) 'Socio-technical issues in professional translation practice', *Translation Spaces*, 6(1), pp. 104–122.

Ehrensberger-Dow, M. and Hunziker Heeb, A. (2016) 'Investigating the ergonomics of a technologized translation workplace', in R. Muñoz Martín (ed.) *Re-embedding translation process research*. Amsterdam: John Benjamins Publishing, pp. 69–88.

Ehrensberger-Dow, M. and Massey, G. (2019) 'Translation workplace-based research', in M. O'Hagan (ed.) *The Routledge handbook of translation and technology*. London: Routledge, pp. 354–369.

ELIS (2023) *European language industry survey 2023: trends, expectations and concerns of the European language industry*. Available at: https://elis-survey.org/wp-content/uploads/2023/03/ELIS-2023-report.pdf (Accessed: 03 April 2024).

Eurlex (2019) *Council recommendation of 9 July 2019 on the 2019 National Reform Programme of Italy and delivering a Council opinion on the 2019 Stability Programme of Italy*. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019H0905(12)&qid=1640800651969 (Accessed: 07/10/2024).

Farrell, M. (2023) 'Do translators use machine translation and if so how? Results of a survey held among professional translators', *Translating and the Computer*, 44, pp. 49-60.

Federico, M., Cattelan, A. and Trombetti, M. (2012) 'Measuring user productivity in machine translation enhanced computer assisted translation', in *Proceedings of the Tenth Conference of the Association for Machine Translation in the Americas (AMTA)*, San Diego, CA, USA, 28 October–1 November 2012. Madison, WI, USA: AMTA, pp. 44–56.

Feilzer, M.Y. (2010) 'Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm', *Journal of Mixed Methods Research*, 4(1), pp. 6–16.

Fine, G.A. (2010) 'Ten lies of ethnography: Moral dilemmas of field research', in Atkinson, P. & Delamont, S. (eds.) *SAGE qualitative research methods*. SAGE, pp. 251–272. doi:10.4135/9780857028211.

Forcada, M.L. (2017) 'Making sense of neural machine translation', *Translation Spaces*, 6(2), pp. 291–309. doi:10.1075/ts.6.2.06for.

García, I. (2015) 'Computer-aided translation: systems', in Chan, S.W. (ed.) *Routledge encyclopedia of translation technology*. Routledge, pp. 68–87.

Gaspari, F., Toral, A., Kumar, N.S., Groves, D. and Way, A. (2014) 'Perception vs reality: Measuring machine translation post-editing productivity', in O'Brien, S., Simard, M. & Specia, L. (eds.) *Proceedings of the 11th Conference of the Association for Machine Translation in the Americas: Workshop on Post-editing Technology and Practice (WPTP3)*, Vancouver, pp. 60-72.

Gaspari, F. and Somers, H. (2007) 'Making a sow's ear out of a silk purse: (mis)using online MT services as bilingual dictionaries', in *Proceedings of Translating and the Computer 29*, London, UK: Aslib.

Gibbs, G.R. (2018) *Analyzing qualitative data*. 2nd edn. London: Sage.

Goldkuhl, G. (2021) 'Pragmatism vs interpretivism in qualitative information systems research', *European Journal of Information Systems*, 21(2), pp. 135-146. doi:10.1057/ejis.2011.54.

Göpferich, S. (2009) 'Towards a Model of Translation Competence and Its Acquisition: The Longitudinal Study TransComp', in Göpferich, S., Jakobsen, A.L. & Mess, I.M. (eds.) *Behind the Mind: Methods Models and Results in Translation Process Research*. Copenhagen: Samfundslitteratur, pp. 11-37.

Gough, J. (2011) 'An empirical study of professional translators' attitudes, use, and awareness of Web 2.0 technologies and implications for the adoption of emerging technologies and trends', *Linguistica Antverpiensia New Series – Themes in Translation Studies*, 10, pp. 195-225.

Gough, J., Temizöz, Ö., Hieke, G. and Zilio, L. (2023) 'Concurrent translation on collaborative platforms', *Translation Spaces* 12 (1), pp. 45-73. doi:10.52034/LANSTTS.V10I.284.

Greene, J.C., Caracelli, V.J. and Graham, W.F. (1989) 'Toward a Conceptual Framework for Mixed-method Evaluation Designs', *Educational Evaluation and Policy Analysis*, 11(3), pp. 255-274.

Guillemin, M., and Gillam, L., (2004) Ethics, reflexivity, and 'ethically important moments' in research. *Qualitative inquiry*, 10 (2), 261–280. doi:10.1177/1077800403262360.

Halverson, S.L. and Muñoz Martín, R. (2020) 'The times they are a'changin: Multilingual mediated communication and cognition', in Muñoz Martín, R. & Halverson, S.L. (eds.) *Multilingual mediated communication and cognition* (IATIS Yearbook series). Routledge.

Hartnell, C.A., Ou, A.Y. and Kinicki, A. (2011) 'Organizational Culture and Organizational Effectiveness: A Meta-analytic Investigation of the Competing Values Framework's Theoretical Suppositions', *Journal of Applied Psychology*, 96(4), pp. 677-694.

Hassan, H., Aue, A., Chen, C., Chowdhary, V., Clark, J., Federmann, C. and Zhou, M. (2018) 'Achieving Human Parity on Automatic Chinese to English News Translation', *arXiv preprint*, 1803.05567. Available at: http://aka.ms/Translator-HumanParityData (Accessed: 22/05/2023).

Heinisch, B. and Lušicky, V. (2019) 'User expectations towards machine translation: A case study', in *Proceedings of Machine Translation Summit XVII Volume 2: Translator Project and User Tracks*, 19–23 August 2019, Dublin, Ireland, pp. 42-48.

Herzberg, F. (1959) *The Motivation to Work*. New York: John Wiley & Sons.

Herzberg, F. (1966) *Work and the Nature of Man*. Cleveland: World Publishing Company.

Herzberg, F. (1968) 'One More Time: How do you Motivate Employees?', in *Manage People Not Personnel: Motivation and Performance Appraisal*. Boston, MA: Harvard Business School Press, pp. 49-76.

Herzberg, F. (1987) 'One more time: How do you motivate employees?', *Harvard Business Review*, Reprint 87507.

Holmes, A. G. D. (2020). Researcher Positionality--A Consideration of Its Influence and Place in Qualitative Research--A New Researcher Guide. Shanlax International Journal of Education, 8(4), 1-10

Holstein, J.A. and Gubrium, J.F. (2012) *The active interview*. CA: Sage.

Hora, G.P.R., Ribas, R.J. and de Souza, M.A. (2018) 'State of the Art of Job Satisfaction Measures: A Systematic Review', *Trends in Psychology*, 26(2), pp. 987–1002.

Hubscher-Davidson, S. (2017) 'Do Translation Professionals Need to Tolerate Ambiguity to Be Successful? A Study of the Links between Tolerance of Ambiguity, Emotional Intelligence, and Job Satisfaction', in Lacruz, I. & Jääskeläinen, R. (eds.) *Innovation and Expansion in Translation Process Research*. Amsterdam and Philadelphia: John Benjamins, pp. 77–103.

Hubscher-Davidson, S. (2018). *Translation and emotion: A psychological perspective.* Routledge/Taylor & Francis Group.

Hutchins, J.W. (1998) 'The origins of the translator's workstation', *Machine Translation*, 13 (4), pp. 287–307.

Inghilleri, M. (2009) 'Sociological approaches', in Baker, M. & Saldanha, G. (eds.) *Routledge Encyclopaedia of Translation Studies*. 2nd edn. London and New York: Routledge, pp. 279-282.

James, N. and Busher, H. (2009) *Online interviewing*. London: Sage.

Johnson, J.M. and Rowlands, T. (2012) 'The interpersonal dynamics of in-depth interviewing', in Gubrium, J.F., Holstein, J.A., Marvasti, A.B. & McKinney, K.D. (eds.) *The SAGE handbook of interview research: the complexity of the craft*. 2nd edn. CA: Sage, pp. 99-114.

Johnson, R.B. and Onwuegbuzie, A.J. (2004) 'Mixed methods research: A research paradigm whose time has come', *Educational Researcher*, 33(7), pp. 14–26.

Kaiser, K. (2012) 'Protecting confidentiality', in Gubrium, J.F., Holstein, J.A., Marvasti, A.B. & McKinney, K.D. (eds.) *The SAGE handbook of interview research: the complexity of the craft*. 2nd edn. CA: Sage, pp. 457-462.

Karamanis, N., Luz, S. and Doherty, G. (2011) 'Translation practice in the workplace: contextual analysis and implications for machine translation', *Machine Translation*, 25(1), pp. 35–52.

Katan, D. (2009) 'Translation theory and professional practice: A global survey of the great divide', *Hermes – Journal of Language and Communication Studies*, 42, pp. 111–153.

Katan, D. (2011) 'Occupation or profession: a survey of the translators' world', in Sela-Sheffy, R. and Shlesinger, M. (eds) *Profession, identity and status: translators and interpreters as an occupational group*. Amsterdam: John Benjamins Publishing, pp. 65–88.

Katyal, K.R. and King, M.E. (2014) 'Non-Chinese researchers conducting research in Chinese cultures: critical reflections', *International Journal of Research & Method in Education*, 37(1), pp. 44–62. doi: 10.1080/1743727X.2012.736484.

Kelly, M., Dowling, M. and Millar, M. (2018) 'The search for understanding: The role of paradigms', *Nurse Researcher*, 25(4), pp. 9–13. https://doi.org/10.7748/nr.2018.e1499.

Kenny, D. (2011) 'The ethics of machine translation', Paper presented at the New Zealand Society of Translators and Interpreters annual conference, Auckland, New Zealand.

Kenny, D. (2017) *Human issues in translation technology: The IATIS yearbook*. London: Routledge.

Kenny, D. (2018) 'Sustaining disruption? The transition from statistical to neural machine translation', *Revista Tradumàtica. Tecnologies de la Traducció*, 16, pp. 59–70. https://doi.org/10.5565/rev/tradumatica.221.

Khayrallah, H. and Koehn, P. (2018) 'On the impact of various types of noise on neural machine translation', in *Proceedings of the 2nd Workshop on Neural Machine Translation and Generation*, Melbourne, Australia. Association for Computational Linguistics, pp. 74–83.

Killman, J. and Mellinger, C. D. (2022) 'Technologized legal translation and interpreting: Resource potential, availability, and applications', *Revista de Llengua i Dret: Journal of Language and Law*, 78, pp. 1–8. https://doi.org/10.2436/rld.i78.2022.3896.

Killman, J. and Rodríguez-Castro, M. (2022) 'Post-editing vs. translating in the legal context: Quality and time effects from English to Spanish', *Revista de Llengua i Dret: Journal of Language and Law*, 78, pp. 56-72. https://doi.org/10.2436/rld.i78.2022.3831.

Kinnunen, T. and Koskinen, K. (2010) 'Introduction', in Kinnunen, T. and Koskinen, K. (eds) *Translator's Agency*. Tampere: Tampere University Press, pp. 4–10.

Kline, R. and Pinch, T. (1996) 'Users as Agents of Technological Change: The Social Construction of the Automobile in the Rural United States', *Technology and Culture*, 37(4), pp. 763–795. doi: 10.2307/3107097.

Kocmi, T.; Federmann, C.; Grundkiewicz, R.; Junczys-Dowmunt, M.; Matsushita, H. & Menezes, A. (2021), To Ship or Not to Ship: An Extensive Evaluation of Automatic Metrics for Machine Translation., in Loïc Barrault; Ondrej Bojar; Fethi Bougares; Rajen Chatterjee; Marta R. Costa jussà; Christian Federmann; Mark Fishel; Alexander Fraser; Markus Freitag; Yvette Graham; Roman Grundkiewicz; Paco Guzman; Barry Haddow; Matthias Huck; Antonio Jimeno-Yepes; Philipp Koehn; Tom Kocmi; André Martins; Makoto Morishita & Christof Monz, ed., 'WMT@EMNLP' , Association for Computational Linguistics, pp. 478-494.

Koponen, M. (2012) 'Comparing human perceptions of post-editing effort with post-editing operations', in *Proceedings of the Seventh Workshop on Statistical Machine Translation*, Association for Computational Linguistics, pp. 181–190.

Koponen, M. (2016) 'Is machine translation post-editing worth the effort? A survey of research into post-editing and effort', *The Journal of Specialised Translation*, 25, pp. 131–148.

Koskinen, K. (2020) *Translation and Affect: Essays on Sticky Affects and Translational Affective Labour*. Amsterdam and Philadelphia: John Benjamins.

Kotan, M. (2010) 'Freedom or happiness? Agency and subjective well-being in the capability approach', *The Journal of Socio-Economics*, 39, pp. 369–375. doi: 10.1016/j.socec.2009.11.003.

Krebs, R. M. and Woldorff, M. G. (2017) 'Cognitive control and reward', in Egner, T. (ed.) *The Wiley Handbook of Cognitive Control*. Chichester, UK: John Wiley & Sons Ltd, pp. 422–439.

Krings, H. P. (2001) *Repairing Texts: Empirical Investigations of Machine Translation Post-Editing Processes*. Edited by Koby, G. S. Kent, Ohio and London: The Kent State University Press.

Kujamäki, M. (2019) 'Source text influence in student translation: results of a longitudinal study', *The Interpreter and Translator Trainer*, 13(4), pp. 390-407.

Kumpulainen, M. (2016) *Learning translation: an empirical study into the acquisition of interlingual text production skills*. PhD thesis. University of Eastern Finland.

Kung, S. W. (2015) 'Bourdieu's capital and Latour's actor-network theory as conceptual tools in translation research', in Ko, L. (ed.) *Translation and cross-cultural communication studies in the Asia Pacific*. Leiden: Brill, pp. 389-403.

Lacruz, I. and Shreve, G.M. (2014) 'Pauses and cognitive effort in post-editing', in *Post-editing of machine translation: processes and applications*, p. 246.

Lagoudaki, E. (2006) 'Translation memories survey 2006: Users' perceptions around TM use', in *Proceedings of the ASLIB International Conference Translating & the Computer*, 28(1), pp. 1-29. http://mt-archive.info/Aslib-2006-Lagoudaki.pdf.

Lai, Y., Saab, N. and Admiraal, W. (2022) 'University students' use of mobile technology in self-directed language learning: using the integrative model of behavior prediction', *Computers & Education*, 179, doi: 10.1016/j.compedu.2021.104413.

Lambert, J. and Walker, C. (2022) 'Because We're Worth It: Disentangling Freelance Translation Status and Rate-Setting in the United Kingdom', *Translation Spaces*, 11(2), pp. 277–302. doi:10.1075/ts.21030.lam.

Lambert, J. and Walker, C. (2024) 'Thriving or Surviving in the Translation Profession', *Finnish Journal of Translation and Interpreting Studies*, 17(1), Mikael. doi:10.61200/mikael.136209.

Lange, C. A. and Bennett, W. S. (2000) 'Combining machine translation with translation memory at Baan', in Sprung, R.C. (ed.) *Translating into Success: Cutting-edge strategies for going multilingual*

in a global age [American Translators Association Scholarly Monograph Series 11]. Amsterdam and Philadelphia: John Benjamins, pp. 203–218.

Latour, B. (1986) 'The powers of association', in Law, J. (ed.) *Power, action, belief: A new sociology of knowledge?*. London: Routledge & Kegan Paul, pp. 264-280.

Latour, B. (1992) 'Where are the missing masses? The sociology of some mundane artifacts', in Bijker, W.E. and Law, J. (eds.) *Shaping Technology/Building Society*. Cambridge, MA: MIT Press, pp. 225–258.

Latour, B. (1994) 'On technical mediation: Philosophy, sociology, genealogy', *Common Knowledge*, 3(2), pp. 29-64.

Latour, B. (1996) 'On actor-network theory: a few clarifications', *Soziale Welt*, 47, pp. 369-381.

Latour, B. (1999) *Pandora's hope: essays on the reality of science studies*. Cambridge, Massachusetts: Harvard University Press.

Latour, B. (2005) *Reassembling the social: an introduction to actor-network theory*. Oxford: Oxford University Press.

Latour, B. (2017) 'On Actor-Network Theory. A Few Clarifications Plus More Than a Few Complications', *Philosophical Literary Journal Logos*, 27(1), pp. 173-197. doi: 10.22394/0869-5377-2017-1-173-197.

Läubli, S. and Orrego, D. (2017) 'When Google Translate is better than Some Human Colleagues those People are no longer Colleagues', in *Proceedings of the 39th Conference Translating and the Computer*, London, UK, pp. 59–69

Läubli, S., Sennrich, R. and Volk, M. (2018) 'Has machine translation achieved human parity? A case for document-level evaluation', *Proceedings of the 2018 Conference on Empirical Methods in Natural Language Processing*, Brussels, Belgium, pp. 4791–4796.

Lavault-Olléon, E. (2011) 'L'ergonomie: nouveau paradigme pour la traductologie', *ILCEA*, 14: Traduction et Ergonomie.

Law, J. (1992) 'Notes on the Theory of the Actor-Network: Ordering Strategy and Heterogeneity', *Systems Practice*, 5, pp. 379-393.

Law, J. (1997) *The manager and his powers*. Published by the Centre for Science Studies, Lancaster University, Lancaster, LA1 4YN, UK.

Law, J. (2007) 'Making a mess with method', in Outhwaite, W. and Turner, S. P. (eds.) *The Sage Handbook of Social Science Methodology*. London: Sage, pp. 595-606.

Law, J. (2009) 'Actor network theory and material semiotics', in Turner, B. S. (ed.) *The new Blackwell companion to social theory*. 2nd edn. West Sussex: Blackwell, pp. 141-158.

Leblanc, M. (2017) '"I Can't Get No Satisfaction!": Should We Blame Translation Technologies or Shifting Business Practices?', in Kenny, D. (ed.) *Human Issues in Translation Technology*. London and New York: Routledge, pp. 45–62.

Lee, J.D. and See, K.A. (2004) 'Trust in Automation: Designing for Appropriate Reliance', *Human Factors*, 46(1), pp. 50–80.

Lesznyák, Á. (2019) 'Hungarian translators' perceptions of neural machine translation in the European commission', in *Proceedings of MT Summit XVII, Volume 1: Research Track*. Dublin, Ireland: European Association for Machine Translation (EAMT), pp. 16–22.

Li, Z., Chi, C. and Zhan, Y. (2020) 'Corpus Augmentation for Improving Neural Machine Translation', *Computers Materials & Continua*, 64(1), pp. 637-650.

Lincoln, Y.,S, and Guba, E. G. (1985) *Naturalistic inquiry.* Newbury Park, CA, Sage.

Lincoln, Y. S. and Guba, E. G. (2000) 'Paradigmatic controversies, contradictions, and emerging confluences', in Lincoln, Y. S. and Guba, E. G. (eds.) *Handbook of qualitative research*. Thousand Oaks, CA: Sage, pp. 163-188.

Litwin, A. S. (2011) 'Technological Change at Work: The Impact of Employee Involvement on the Effectiveness of Health Information Technology', *ILR Review*, 64(5), pp. 863-888. doi: 10.1177/001979391106400502.

Locke, E. A. (1969) 'What is job satisfaction?', *Organizational Behavior & Human Performance*, 4(4), pp. 309–336. doi: 10.1016/0030-5073(69)90013-0.

Locke, E. A. (2004) 'What Should we do about Motivation Theory? Six Recommendations for the 21st Century', *Academy of Management Review*, 29, pp. 388-403.

Lommel, A. (2017) 'Augmented Translation Puts Translators Back in the Center', *The IIGLOG. How to Create and Deliver Intelligent Information*. Available at: https://intelligent-information.blog/en/augmented-translation-puts-translators-back-in-the-center/ [Accessed 12/12/2021].

Lukka, K. and Vinnari, E. (2017) 'Combining actor-network theory with interventionist research: present state and future potential', *Accounting Auditing & Accountability Journal*, 30(3), pp. 720-753. doi: 10.1108/AAAJ-08-2015-2176.

Macken, L., Prou, D. and Tezcan, A. (2020) 'Quantifying the Effect of Machine Translation in a High-Quality Human Translation Production Process', *Informatics*, 7(2), p. 12. doi: 10.3390/informatics7020012.

Mari, C. and Meglio, O. (2013) 'Planning data collection in longitudinal field studies: small and not so small practical issues', in Hassett, M. and Paavilainen-Mäntymäki, E. (eds.) *Handbook of Longitudinal Research Methods in Studies of Organizations*. Cheltenham: Edward Elgar, pp. 295-317.

Marshman, E. (2014). Taking Control: Language Professionals and Their Perception of Control when Using Language Technologies. *Meta*, *59*(2), pp. 380–405. DOI: 10.7202/1027481ar

Maslow, A. H. (1954) *Motivation and Personality*. New York: Harper.

Matthews, B. and Ross, L. (2010) *Research methods: a practical guide for the social sciences*. New York: Pearson Longman.

Mattox II, J. R. and Jinkerson, D. L. (2005) 'Using Survival Analysis to Demonstrate the Effects of Training on Employee Retention', *Evaluation and Program Planning*, pp. 423-430.

Mahfouz, I. (2018) 'Attitudes to CAT Tools: Application on Egyptian Translation Students and Professionals', *Arab World English Journal (AWEJ)*, Special Issue on CALL, 4.

Ehrensberger-Dow, M., Delorme, Benites Lehr, C. (2023) 'A new role for translators and trainers: MT literacy consultants', *The Interpreter and Translator Trainer*, 17(3), pp. 393-411. doi: 10.1080/1750399X.2023.2237328.

Maxwell, J. A. (2016) 'Expanding the history and range of mixed methods research', *Journal of Mixed Methods Research*, 10(1), pp. 12–27.

Mayo, E. (1949) *The social problems of an industrial civilization*. London: Routledge and Kegan Paul.

Meidert, U., Neumann, S., Ehrensberger-Dow, M. and Becker, H. (2016) 'Physical ergonomics at translators' workplaces: findings from ergonomic workplace assessments and interviews', *ILCEA*, 27.

Melby, A. K. (1995) 'Why Can't a Computer Translate More Like a Person?', available from: http://www.mt-archive.info/Melby-1995.pdf.

Mellinger, C. D. (2014) *Computer-Assisted Translation: An Empirical Investigation of Cognitive Effort* (Unpublished Ph.D. dissertation). Kent State University, Kent, OH. Available at: http://bit.ly/1ybBY7W.

Mellinger, C. D. (2020) 'Core research questions and methods', in Angelone, E., Ehrensberger-Dow, M. and Massey, G. (eds.) *The Bloomsbury Companion to Language Industry Studies*. New York: Bloomsbury, pp. 15-35.

Mellinger, C. D. and Hanson, T. A. (2017) *Quantitative research methods in translation and interpreting studies*. New York: Routledge.

Mellinger, C. D. and Hanson, T. A. (2022) 'Considerations of ecological validity in cognitive translation and interpreting studies', *Translation Cognition & Behavior*, 5(1), pp. 1-26.

Mertens, O. M. (1998) *Research methods in education and psychology: Integrating diversity with quantitative and qualitative approaches*. Thousand Oaks, CA: Sage.

Michael, M. (2017) *Actor-network theory: trials, trails and translation*. Los Angeles: Sage.

Mileto, F. (2019) 'Post-Editing and Legal Translation', *H2D. Revista de Humanidades Digitais*, 1(1). doi: 10.21814/h2d.237.

Mileto, F. and Muzii, L. (2010) 'Teaching computer-assisted translation and localization: a project-based approach', in *Teaching translation and interpreting: Challenges and practices*. Newcastle: Cambridge Scholars Publishing, pp. 3-14. ISBN: 978-1443825009.

Miller, R. L. and Brewer, J. (eds.) (2003) *The A-Z of Social Research*. London: SAGE Publications Ltd.

Milošević, J. & Risku, H. (2020) 'Situated cognition and the ethnographic study of translation processes: Translation scholars as outsiders, consultants and passionate participants', *Linguistica Antverpiensia New Series: Themes in Translation Studies*, 19, pp. 111–131.

Mitchell, V.L. & Nault, B.R. (2003) *The emergence of functional knowledge in sociotechnical systems*. Calgary: Haskayne School of Business, University of Calgary.

MITD (n.d.) 'Ministro per l'innovazione tecnologica e la transizione digitale'. Available at: https://innovazione.gov.it/dipartimento/en/structure/ (Accessed: 06/12/2021).

Mohammed, S.M.M., Samad, S.S. & Mahdi, H.S. (2020) 'The attitudes of professional translators and translation students towards computer-assisted translation tools in Yemen', *Journal of Language and Linguistic Studies*, 16(2), pp. 1084–1095. doi: 10.17263/jlls.759371.

Montebelli, A., Herrera, C., and Ziemke, T. (2008). On cognition as dynamical coupling: An analysis of behavioral attractor dynamics. Adaptive Behavior, 16(2/3), 182–195

Monzó-Nebot, E. (2023) 'Translators who own it: A case study on how doxa and psychological ownership impact translators' engagement and job satisfaction', *The International Journal of Translation and Interpreting Research*.

Moorkens, J. (2017) 'Under pressure: translation in times of austerity', *Perspectives*, 25(3), pp. 464-477.

Moorkens, J. (2020a) 'Comparative satisfaction among freelance and directly-employed Irish-Language translators', *Translation & Interpreting*, 12(1), pp. 55-73.

Moorkens, J. (2020b) '"A tiny cog in a large machine": Digital Taylorism in the translation industry', *Translation Spaces*, 9(1), pp. 12–34. doi: 10.1075/ts.00019.moo.

Moorkens, J., Lewis, D., Reijers, W., Vanmassenhove, E. & Way, A. (2016) 'Translation resources and translator disempowerment', in *Proceedings of the European Language Resource Association*. Available at: https://www.elra.info (Accessed: 12/03/2022).

Moorkens, J. & O'Brien, S. (2013) 'User attitudes to the post-editing interface', in O'Brien, S., Simard, M. & Specia, L. (eds.) *Proceedings of MT Summit XIV Workshop on Post-editing Technology and Practice*. Available at: https://mt-summit.com (Accessed: 12/03/2022).

Moorkens, J., O'Brien, S., Da Silva, I.A., De Lima Fonseca, N.B. & Alves, F. (2015) 'Correlations of perceived post-editing effort with measurements of actual effort', *Machine Translation*, 29(3-4), pp. 267–284.

Morgan, D.L. (2007) 'Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods', *Journal of Mixed Methods Research*, 1(1), pp. 48–76.

Morgan, D.L. (2014) *Integrating qualitative and quantitative methods: A pragmatic approach*. London: SAGE Publications Inc.

Morse, J.M. (2015) 'Issues in qualitatively-driven mixed methods designs: Walking through a mixed-methods project', in Hesse-Biber, S. & Johnson, R.B. (eds.) *The Oxford Handbook of Multimethod and Mixed Methods Research Inquiry*. New York: Oxford University Press, pp. 206-222.

Mortensen, J. & Fullmer, S. (2002) 'Professional involvement is associated with increased job satisfaction among dietitians', *Journal of the American Dietetic Association*, 102(10), pp. 1452-1454.

Munnecke, M. & Lugt, R.V.D. (2006) *Bottom-up strategies in consumer-led markets*. CD-ROM ed. Seville: JRC-IPTS.

Nitzke, J., Canfora, C., Hansen-Schirra, S. & Kapnas, D. (2024) 'Decisions in projects using machine translation and post-editing: an interview study', *The Journal of Specialised Translation*, 41, pp. 127–148. doi: 10.26034/cm.jostrans.2024.4715.

Nitzke, J., Hansen-Schirra, S. & Canfora, C. (2019) 'Risk management and post-editing competence', *The Journal of Specialised Translation*, 31, pp. 239–259.

O'Brien, S. (2006) 'Pauses as indicators of cognitive effort in post-editing machine translation output', *Across Languages and Cultures*, 7(1), pp. 1–21.

O'Brien, S. (2010) 'Eye tracking in translation process research: Methodological challenges and solutions', in Mees, I., Alves, F. & Göpferich, S. (eds.) *Methodology, technology and innovation in translation process research*. Copenhagen: Samfundslitteratur, pp. 251–266.

O'Brien, S. (2023) 'Human-centered augmented translation: Against antagonistic dualisms', *Perspectives*. doi: 10.1080/0907676X.2023.2247423.

O'Cathain, A. (2010) 'Assessing the quality of mixed methods research: Toward a comprehensive framework', in Tashakkori, A. & Teddlie, C. (eds.) *Handbook of mixed methods in social and behavioural research*. 2nd ed. Thousand Oaks, CA: Sage, pp. 531–555.

Olohan, M. (2011) 'Translators and translation technology: The dance of agency', *Translation Studies*, 4(3), pp. 342–357. doi: 10.1080/14781700.2011.589656.

Olohan, M. (2017a) 'Technology, translation, and society', *Target*, 29(2), pp. 264–283.

Olohan, M. (2017b) 'Knowing in translation practice: A practice-theoretical perspective', *Translation Spaces*, 6(1), pp. 159–180.

Olohan, M. (2019) 'Sociological approaches to translation technology', in O'Hagan, M. (ed.) *The Routledge Handbook of Translation and Technology*. London: Routledge, pp. 384-397.

O'Reilly, K. (2009) *Key concepts in ethnography*. London: SAGE Publications Ltd. doi: 10.4135/9781446268308.

Otoo, B.K. (2020) 'Declaring my ontological and epistemological stance: A reflective paper', *The Journal of Educational Thought (JET) / Revue de La Pensée Éducative*, 53(1), pp. 67–88. Available at: https://www.jstor.org/stable/27128291 (Accessed: 07/10/2024).

Ozano, K., Khatri, R., (2018) *Reflexivity, positionality and power in cross-cultural participatory action research with research assistants in rural Cambodia*. *Educational Action Research*, 26(2), pp. 190–204. doi:10.1080/09650792.2017.1331860

Parenti, C. (2001) 'Big Brother's corporate cousin', *The Nation*. Available at: https://www.thenation.com/article/big-brothers-corporate-cousin/ (Accessed: 06/12/2021).

Parra Escartín, C. and Arcedillo, M. (2015) 'Machine translation evaluation made fuzzier: A study on post-editing productivity and evaluation metrics in commercial settings', in *Proceedings of the MT Summit XV*, Miami, FL, 30 October–3 November, pp. 131–144.

Patton, M.Q. (1990) *Qualitative research and evaluation methods*. 2nd ed. Newbury Park, CA: Sage.

Phrase (2023) *The present and future of machine translation report written in collaboration with Nimdzi*. Available at: https://phrase.com/resources/the-present-and-future-of-machine-translation/ (Accessed: 07/10/2024).

Pickering, A. (1993) 'The mangle of practice: Agency and emergence in the sociology of science', *American Journal of Sociology*, 99(3), pp. 559–589.

Piecychna, B. (2019) 'Polish sworn translators' attitudes towards the job they perform: Results obtained from a job satisfaction survey', *Studies in Logic, Grammar and Rhetoric*, 58(1), pp. 125–154.

Plano Clark, V.L. and Ivankova, N.V. (2016) *Mixed methods research: A guide to the field*. Thousand Oaks, CA: Sage.

Pole, C. and Hillyard, S. (2016) *Doing fieldwork*. London: SAGE. doi: 10.4135/9781473966383.

Popovic, M., Lommel, A., Burchardt, A., Avramidis, E. and Uszkoreit, H. (2014) 'Relations between different types of post-editing operations, cognitive effort and temporal effort', in *Proceedings of the 17th annual conference of the European Association for Machine Translation*, pp. 191–198.

Poulsen, K. M., (2006), Implementing successful mentoring programs: career definition vs mentoring approach, in Industrial and commercial training, Vol.38 (5), p.251-258

Pym, A. (2019) 'How automation through neural machine translation might change the skill sets of translators'. Available at: https://www.academia.edu/40200406/ (Accessed: 22/04/2022).

Pym, A., Orrego-Carmona, D. and Torres-Simón, E. (2016) 'Status and technology in the professionalisation of translators: Market disorder and the return of hierarchy', *Journal of Specialised Translation*, 25, pp. 33–53.

Pym, A. and Torres-Simón, E. (2021) 'Is automation changing the translation profession?', *International Journal of the Sociology of Language*, 2021(270), pp. 39–57. doi: 10.1515/ijsl-2020-0015.

Quinci, C. (2015) *Translators in the making: An empirical longitudinal study on translation competence and its development*. PhD thesis. Università degli Studi di Trieste.

Quinci, C. (2023) 'To use or not to use MT?: Some insights into trust and reliance from the LeMaTTT Project', *Rivista Internazionale di Tecnica della Traduzione / International Journal of Translation*, 25, pp. 147-165. doi: 10.13137/2421-6763/35502.

Ragni, V. and Vieira, N. L. (2021) 'What has changed with neural machine translation? A critical review of human factors', *Perspectives: Studies in Translation Theory and Practice*. doi: 10.1080/0907676X.2021.1889005

Reinke, U. (2004) *Translation memories: Systeme Konzepte linguistische Optimierung*. Frankfurt am Main: Lang.

Reinke, U. (2011) 'State of the art in Translation Memory Technology', in Rehm, G., Sasaki, F., Stein, D. and Witt, A. (eds.) *Language technologies for a multilingual Europe: TC3 III*, pp. 55–84. Berlin: Language Science Press.

Richards, L. (2005) *Handling qualitative data: A practical guide*. London/Thousand Oaks, CA: Sage Publications.

Rikters, M. (2018) 'Impact of corpora quality on neural machine translation', *Baltic HLT*.

Risku, H. (2004) *Translationsmanagement: Interkulturelle Fachkommunikation im Informationszeitalter*. Tübingen: Gunter Narr.

Risku, H. (2016) *Translationsmanagement: Interkulturelle Fachkommunikation im Informationszeitalter*. 3rd edn. Tübingen: Gunter Narr.

Risku, H. (2017) 'Ethnographies of translation and situated cognition', in Schwieter, J.W. and Ferreira, A. (eds.) *The handbook of translation and cognition*, pp. 290–310. Oxford: Wiley-Blackwell.

Risku, H., Rogl, R. and Milošević, J. (2019) 'Translation research in the field: Current research on socio-cognitive processes', in Risku, H., Rogl, R. and Milošević, J. (eds.) *Translation practice in the field: Current research on socio-cognitive processes*, pp. 1–24. John Benjamins.

Risku, H., Rogl, R. and Milošević, J. (2020) 'Researching workplaces', in Angelone, E., Ehrensberger-Dow, M. and Massey, G. (eds.) *The Bloomsbury companion to language industry studies*. New York: Bloomsbury, pp. 37-62.

Risku, H., Milošević, J. and Rogl, R. (2019) 'Changes in the field of translation project management: Findings of a longitudinal ethnographic study'. *Working Paper*. Available at: https://socotrans.univie.ac.at/fileadmin/user_upload/p_socotrans/20190613_Working_Paper_Changes_Risku_Milosevic_Rogl.pdf (Accessed: 07/10/2024).

Rivera, G. and Cox, A.M. (2016) 'An actor-network theory perspective to study the non-adoption of a collaborative technology intended to support online community participation', *Academia Revista Latinoamericana de Administracion*, 29(3), pp. 347-365. doi: 10.1108/ARLA-02-2015-0039.

Rodriguez-Castro, M. (2011) *Elements of task, job and professional satisfaction in the language industry: An empirical model*. Doctoral Dissertation.

Rodriguez-Castro, M. (2015a) 'Development and empirical validation of a multifaceted instrument for translator satisfaction', *Translation & Interpreting*, 7(2), pp. 1-21.

Rodríguez-Castro, M. (2015b) 'Conceptual construct and empirical validation of a multifaceted instrument for translator satisfaction', *The International Journal of Translation and Interpreting Research*, 7(2), pp. 30–50. doi: 10.12807/ti.107202.2015.a03.

Rodríguez-Castro, M. (2016) 'Intrinsic and extrinsic sources of translator satisfaction: An empirical study', *Entreculturas*, 7-8, pp. 195-229.

Rodríguez-Castro, M. (2024) 'Extrinsic sources of translator job satisfaction: Revisiting critical factors in a multifaceted construct', *Translation Spaces*. doi: 10.1075/ts.23024.rod.

Rosenthal, S.B. (2011) 'The process of pragmatism: Some wide-ranging implications', *The Pluralist*, 6(3), pp. 5–18.

Rossetti, A. and O'Brien, S. (2019) 'Helping the helpers: Evaluating the impact of a controlled language checker on the intralingual and interlingual translation tasks involving volunteer health professionals', *Translation Studies*, 12(2), pp. 253-271. doi: 10.1080/14781700.2019.1689161.

Rossi, C. and Chevrot, J.P. (2019) 'Uses and perceptions of machine translation at the European Commission', *The Journal of Specialised Translation*, 31, pp. 177–200.

Rowe, W.E. (2014) Positionality. In: D. Coghlan and M. Brydon-Miller (eds.) *The SAGE encyclopedia of action research*. London: Sage

Ruokonen, M. and Koskinen, K. (2017) 'Dancing with technology: Translators' narratives on the dance of human and machinic agency in translation work', *The Translator*, 23(3), pp. 310-323. doi: 10.1080/13556509.2017.1301846.

Ruokonen, M. and Mäkisalo, J. (2018) 'Middling-status profession, high-status work: Finnish translators' status perceptions in the light of their backgrounds, working conditions and job satisfaction', *Translation & Interpreting*, 10(1), pp. 1-17. Available at: http://www.trans-int.org/index.php/transint/article/view/681 (Accessed: 07/10/2024).

Ruokonen, M. and Svahn, E. (2024) 'What do we know about translators' job satisfaction? An exploratory overview of research result', *Translation Spaces* [Epub ahead of print 09 April 2024], pp. 1-25. doi: 10.1075/ts.23019.ruo.

Sakamoto, A. (2019) 'Why do many translators resist post-editing? A sociological analysis using Bourdieu's concepts', *The Journal of Specialised Translation*, 31, pp. 201–216.

Sakamoto, A. and Yamada, M. (2020) 'Social groups in machine translation post-editing: A SCOT analysis', *Translation Spaces*, 9(1), pp. 78-97.

Saldaña, J. (2009) *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage.

Saldaña, J. (2003) *Longitudinal qualitative research: Analyzing change through time*. CA: Altamira.

Saldaña, J. (2016) *The coding manual for qualitative researchers*. London: Sage.

Saldanha, G. (2009) 'Principles of corpus linguistics and their application to translation studies research', *Tradumática*, 7.

Saldanha, G. and O'Brien, S. (2014) *Research methodologies in translation studies*. London: Routledge.

Sánchez-Gijón, P., Moorkens, J. and Way, A. (2019) 'Post-editing neural machine translation versus translation memory segments', *Machine Translation*, 33(1-2), pp. 31–59. doi: 10.1007/s10590-019-09232-x.

Sandelowski, M. (2003) 'Tables or tableaux? The challenges of writing and reading mixed methods studies', in Tashakkori, A. and Teddlie, C. (eds.) *Handbook of mixed methods in social and behavioral research*, pp. 321–350. Thousand Oaks, CA: Sage.

Sarker, S., Sarker, S. and Sidorova, A. (2006) 'Understanding business process change failure: An actor-network perspective', *Journal of Management Information Systems*, 23(1), pp. 51-86. doi: 10.2753/MIS0742-1222230102.

Savenkov, K. and Lopez, M. (2022) 'The state of the machine translation 2022', in *Proceedings of the 15th Biennial Conference of the Association for Machine Translation in the Americas*, pp. 32–49. Orlando: Association for Machine Translation in the Americas.

Savin-Baden, M., Major, C.H. (2013) *Qualitative research: the essential guide to theory and practice*. 1st edn. New York: Routledge.

Sayes, E. (2014) 'Actor-network theory and methodology: Just what does it mean to say that nonhumans have agency?', *Social Studies of Science*, 44, pp. 134-149.

Schofield, J.W. (2000) 'Increasing the generalizability of qualitative research', in Gomm, R., Hammersley, M. and Foster, P. (eds.) *Case study method: Key issues*. London: Sage, pp. 69–97.

Schoonenboom, J. and Johnson, R.B. (2017) 'How to construct a mixed methods research design', *Kolner Zeitschrift fur Soziologie und Sozialpsychologie*, 69(Suppl 2), pp. 107–131. doi: 10.1007/s11577-017-0454-1.

Sela-Sheffy, R. and Shlesinger, M. (2008) 'Strategies of image-making and status advancement of translators and interpreters as a marginal occupational group', in Pym, A., Shlesinger, M. and Simeoni, D. (eds.) *Beyond descriptive translation studies: Investigations in homage to Gideon Toury*. Amsterdam/Philadelphia: John Benjamins, pp. 79–90.

Sepesy Maučec, M. and Donaj, G. (2020) 'Machine translation and the evaluation of its quality', *IntechOpen*. doi: 10.5772/intechopen.89063.

Shah, S. (2004) 'The researcher/interviewer in intercultural context: a social intruder!', *British Educational Research Journal*, 30(4), pp. 549–570.

Shneiderman, B. (2022) 'Human-centered AI: Ensuring human control while increasing automation', in *Proceedings of the 5th Workshop on Human Factors in Hypertext (HUMAN '22)*. New York: Association for Computing Machinery, Article 1, pp. 1–2. doi: 10.1145/3538882.3542790.

Simmons, M. (2007) 'Insider ethnography: Tinker, tailor, researcher or spy?', *Nurse Researcher*, 14(4), pp. 7–14. doi: 10.7748/nr2007.07.14.4.7.c6039.

Simovska, V., Colding Lagermann, L., Salah, A.H., Lerche, M.L. and Kousholt, D. (2019) 'Inside out: What we (don't) talk about when we talk about research', *Qualitative Research*, 19(2), pp. 113–130. doi: 10.1177/1468794117749165.

Snover, M., Dorr, B., Schwartz, R., Micciulla, L. and Makhoul, J. (2006) 'A study of translation edit rate with targeted human annotation', in *Proceedings of Association for Machine Translation in the Americas*.

Spector, P. (2022) *Job satisfaction: From assessment to intervention*. New York: Routledge.

Spector, P.E. (1997) *Job satisfaction: Application, assessment, causes, and consequences*. Thousand Oaks, CA: SAGE.

Stefaniak, K. (2020) 'Evaluating the usefulness of neural machine translation for the Polish translators in the European Commission', in *Proceedings of the 22nd Annual Conference of the*

European Association for Machine Translation, Lisboa, Portugal, 3–5 November 2020. Lisboa: European Association for Machine Translation, pp. 263–269.

Stein, J. (2012) *Bottom-up and top-down innovation: Create an innovative company*. New York: Simply Innovate.

Stone, F.M. (2007) *Coaching, counseling & mentoring : how to choose & use the right technique to boost employee performance / Florence M. Stone.* 2nd ed. New York: American Management Association.

Strong, M. (2009) *Effective teacher induction and mentoring: Assessing the evidence*. New York: Teachers College, Columbia University.

Svahn, E. (2020) *The dynamics of extratextual translatorship in contemporary Sweden: A mixed methods approach*. PhD thesis. University of Stockholm. urn:nbn:se:su

Tatsumi, M. (2009) 'Correlation between automatic evaluation metric scores, post-editing speed, and some other factors', in *The Twelfth Machine Translation Summit*, pp. 332–339.

TAUS (2016) 'Post-editing guidelines'. Available at: https://www.taus.net/insights/reports/taus-post-editing-guidelines (Accessed: 09/12/2021).

Teixeira, C.S.C. (2014) *The impact of metadata on translator performance: How translators work with translation memories and machine translation*. PhD thesis. Universitat Rovira i Virgili, Spain.

Teixeira, C.S.C. (2014) 'Perceived vs. measured performance in the post-editing of suggestions from machine translation and translation memories', in O'Brien, S., Simard, M. and Specia, L. (eds.) *Proceedings of the 11th Conference of the Association for Machine Translation in the Americas: Workshop on Post-Editing Technology and Practice (WPTP3)*, pp. 450–459. Vancouver: AMTA.

Temnikova, I.P. (2010) 'Cognitive evaluation approach for a controlled language post-editing experiment', in *Proceedings of the International Conference on Language Resources and Evaluation*.

Terribile, S. (2023) 'Is post-editing really faster than human translation?', *Translation Spaces*. doi: 10.1075/ts.22044.ter.

Tezcan, A., Bulté, B. and Vanroy, B. (2021) 'Towards a better integration of fuzzy matches in neural machine translation through data augmentation', *Informatics*, 8(1), p.7. doi: 10.3390/informatics8010007.

Tobin, G. A., Begley, C. M. (2004) 'Methodological rigour within a qualitative framework', *Journal of Advanced Nursing, 48,* pp. 388–396. doi:10.1111/j.1365-2648.2004.03207.x

Toral, A., Castilho, S., Hu, K. and Way, A. (2018) 'Attaining the unattainable? Reassessing claims of human parity in neural machine translation', in *Proceedings of the Third Conference on Machine Translation*, pp. 113–123. Brussels: Association for Computational Linguistics.

Torres, P.M. (2018) 'An overview on strategic design for socio-technical innovation', *Strategic Design Research Journal*.

Torres-Simón, E. and Pym, A. (2017) 'European masters in translation: A comparative study'. Available at: https://www.researchgate.net/publication/314090217_European_Masters_in_Translation_A_comparative_study (Accessed: 07/10/2024).

Toury, G. (1995) *Descriptive translation studies and beyond*. Shanghai: Shanghai Foreign Language Education Press.

Twum-Darko, M. and Harker, L.A.L. (2017) 'Understanding knowledge sharing in an organization: A perspective of actor-network theory', *International Journal of Knowledge Management*, 13(1), pp. 53–74. doi: 10.4018/IJKM.2017010104.

Vardaro, J., Schaeffer, M. and Hansen-Schirra, S. (2019) 'Translation quality and error recognition in professional neural machine translation post-editing', *Informatics*, 6(3), pp. 1–29. doi: 10.3390/informatics6030041.

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A.N., Kaiser, L. and Polosukhin, I. (2017) 'Attention is all you need', in *Proceedings of the 31st International Conference on Neural Information Processing Systems (NIPS)*, pp. 6000–6010. Long Beach, CA: Curran Associates Inc.

Venkatesh, V. and Bala, H. (2008) 'Technology acceptance model 3 and a research agenda on interventions', *Decision Sciences*, 39(2), pp. 273–315.

Venkatesh, V., Brown, S.A. and Bala, H. (2013) 'Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems', *MIS Quarterly*, 37(1), pp. 21–54.

Vieira, L.N. (2020) 'Automation anxiety and translators', *Translation Studies*, 13(1), pp. 1–21. doi: 10.1080/14781700.2018.1543613.

Vieira, L.N. and Alonso, E. (2018) 'The use of machine translation in human translation workflows: Practices, perceptions and knowledge exchange'. Report. Institute of Translation and Interpreting. Available at: http://www/iti.org.uk/images/downloads/ITIReport-Lucas/pdf (Accessed: 04/05/2022).

Vieira, L.N. and Alonso, E. (2020) 'Translating perceptions and managing expectations: An analysis of management and production perspectives on machine translation', *Perspectives*, 28(2), pp. 163–184. doi: 10.1080/0907676X.2019.1646776.

Vieira, L.N., Ragni, V. and Alonso, E. (2021) 'Translation cognition and behavior', *Translation Cognition & Behavior*, 4(1), pp. 124–146. doi: 10.1075/tcb.00052.nun.

Virtanen, T. (2019) *What makes a government translator tick? Examining the Finnish government English translators' perceptions of translator status, job satisfaction and the underlying factors*. PhD thesis. University of Helsinki. Available at: http://urn.fi/URN:ISBN:978-951-51-5535-1 (Accessed: 05/03/2022).

Walsham, G. (1997) 'Actor-network theory and IS research: Current status and future prospects', in *Information systems and qualitative research*. London: Chapman and Hall. doi: 10.1007/978-0-387-35309-8_23.

Walsham, G. and Sahay, S. (1999) 'GIS for district-level administration in India: Problems and opportunities', *Management Information Systems Quarterly*, 23(1), pp. 39–66. doi: 10.2307/249409.

Wang, W., Watanabe, T., Hughes, M., Nakagawa, T. and Chelba, C. (2018) 'Denoising neural machine translation training with trusted data and online data selection', in *Proceedings of the Third Conference on Machine Translation (WMT)*, pp. 133–143. Brussels: Association for Computational Linguistics.

Wang, Y.Y. and Wang, Y.S. (2019) 'Development and validation of an artificial intelligence anxiety scale: An initial application in predicting motivated learning behavior', *Interactive Learning Environments*, 30(4), pp. 619–634. doi: 10.1080/10494820.2019.1674887.

Warin, J. (2011) Ethical mindfulness and reflexivity. In *Qualitative inquiry*, 17 (9), pp. 805–814. doi:10.1177/1077800411423196

Warren, C. (2001) 'Qualitative interviewing', in Gubrium, J. and Holstein, J. (eds.) *Handbook of interview research*. Thousand Oaks, CA: Sage, pp. 83–102.

Way, A. (2013) 'Traditional and emerging use-cases for machine translation', in *Proceedings of Translating and the Computer 35*. London.

Way, C. (2016) 'Burning boats or building bridges? Integrating action research in translator training'. Plenary address at the DidTrad 2016 Conference, Universitat Autònoma de Barcelona, 6–7 July 2016.

Westergaard, J. (2017) *An introduction to helping skills : counselling, coaching and mentoring / Jane Westergaard.* 1st ed. London: SAGE Publications Ltd.

Weber, M. (1968) *Economy and society: An outline of interpretive sociology*. Totowa, NJ: Bedminster Press.

White, R.T. and Arzi, H.J. (2005) 'Longitudinal studies: Designs, validity, practicality and value', *Research in Science Education*, 35, pp. 137–149.

Whittle, A. and Spicer, A. (2008) 'Is actor network theory critique?', *Organization Studies*, 29, pp. 611–629.

Williams, J. and Chesterman, A. (2014) *The map: A beginner's guide to doing research in translation studies*. London: Routledge.

Winiarska, A. (2017) 'Qualitative longitudinal research: Application potentials and challenges in the context of migration research', *CMR Working Papers*, 103(161), pp. 1–29.

Wisdom, J. and Creswell, J.W. (2013) 'Mixed methods: Integrating quantitative and qualitative data collection and analysis while studying patient-centered medical home models', *AHRQ and PCHM*.

Wolf, M. (2012) 'The sociology of translation and its ‘activist turn’', *Translation and Interpreting Studies*, 7(2), pp. 129-143.

Yamada, M. (2019) 'The impact of Google neural machine translation on post-editing by student translators', *The Journal of Specialised Translation*, 31. Available at: https://jostrans.org/issue31/art_yamada.pdf (Accessed: 07/03/2022).

Yip, S. Y. (2024). Positionality and reflexivity: negotiating insider-outsider positions within and across cultures. International Journal of Research & Method in Education, 47(3), 222-232.

Zein, R.M. and Twinomurinzi, H. (2023) 'Perspective chapter: Actor-network theory as an organising structure for blockchain adoption in government', *IntechOpen*. doi: 10.5772/intechopen.106751.

Appendices

Appendix A – DCU Ethical approval

Faculty of Humanities & Social Sciences
DUBLIN CITY UNIVERSITY
05 April 2022

CONFIRMATION OF RESEARCH ETHICS APPROVAL FOR A PROJECT

Application Reference: **DCU-FHSS-2022-021**

Project Title: **The human factor in translation technologies.** Impact of a participatory approach on job satisfaction, productivity and perception in Public Administration

Project contact(s): **fiorenza.mileto2@mail.dcu.ie**

Let this letter certify that the proposed project identified above has been reviewed by the *Humanities & Social Sciences Faculty Research Ethics Committee* (F-REC) and has been approved as a low-risk project. The application was found to that comply with university requirements and best practices for research ethics, and with GDPR guidelines and requirements where personal data is processed in the project.

A copy of the application, including appended documents related to participant consent, is archived under the reference above. Queries about this project's approval may be directed to the F-REC Chair.

Sincerely,

Dr Dónal Mulligan
donal.mulligan@dcu.ie

Chair, Faculty Research Ethics Committee
Faculty of Humanities & Social Sciences
Dublin City University

Dámh na nDaonnachtaí agus na nEolaíochtaí Sóisialta
Ollscoil Chathair Bhaile Átha Cliath

Appendix B – Informed consent form

DUBLIN CITY UNIVERSITY
Informed Consent Form

The human factor in translation technologies. Impact of a participatory approach on job satisfaction, productivity and perception in Public Administration

School of Applied Language and Intercultural Studies, Dublin City University

Principal investigators: Fiorenza Mileto, Joss Moorkens, Federico Gaspari

This research aims at analysing the effects of a customized training and a participatory approach to the introduction of neural machine translation integrated in assisted translation tools that will fulfil the needs of Ministry of Justice by increasing productivity without any drop in translators' satisfaction. The focus of this research is the human factor, and I will verify whether greater involvement of linguists in all the organizational aspects of document translation could help translators' adapt the use of machine to their needs and influence positively technology perception. The findings of this research project will hopefully help to outline some best practices for the introduction of translation technologies in Public Administration.

The ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee.

If I agree to participate, I will answer an on line questionnaire and I will be interviewed by the researcher at the beginning, after about six months and at the end of the research over a period of one year, from March 2022 to March 2023, as stated in the Plain Language Statement. The interviews will be done in person or through video calls on Teams and they will be electronically recorded (audio only).

Participant – please complete the following (Circle Yes or No for each question)	
I have read the Plain Language Statement (or had it read to me)	*Yes/No*
I understand the information provided	*Yes/No*
I understand the information provided in relation to data protection	*Yes/No*
I have had an opportunity to ask questions and discuss this study	*Yes/No*
I have received satisfactory answers to all my questions	*Yes/No*
I am aware that my interview will be audiotaped	*Yes/No*

I may withdraw from the Research Study at any point.

Every effort will be made to respect participants' anonymity. The data collected will be analysed by the principal researcher alone. Participants' actual names will be protected and fake names will be used if direct references are required. Interview notes and/or transcripts will be held by the principal researcher and stored in a secure location.

Signature:

I have read and understood the information in this form. My questions and concerns have been answered by the researchers, and I have a copy of this consent form. Therefore, I consent to take part in this research project

Participants Signature: _____

Name in Block Capitals: _____

Witness: _____

Date: _____

Appendix C – Plain language statement

DUBLIN CITY UNIVERSITY
Plain Language Statement

The human factor in translation technologies. Impact of a participatory approach on job satisfaction, productivity and perception in Public Administration

School of Applied Language and Intercultural Studies, Dublin City University

Principal investigator: Fiorenza Mileto (contact details: fiorenza.mileto2@mail.dcu.ie)
Other investigators: Joss Moorkens, Federico Gaspari

This research aims at analysing the effects of a customized training and a participatory approach to the introduction of neural machine translation integrated in assisted translation tools. The focus of this research is the human factor, and the data gathered through questionnaires and interviews will be used to verify the impact of such technologies on translators' satisfaction, productivity and perception. The findings of this research project will hopefully help to outline some best practices for the introduction of translation technologies in Public Administration.

The Data Controller will be DCU, that will hold data but does not exercise responsibility for or control over the personal data. The DCU Data Protection Officer is Mr. Martin Ward (data.protection@dcu.ie Ph.: 7005118 / 7008257)

Participants will be required to be available for 3 online questionnaires and three face-to-face interviews with the principal researcher. The interviews will last no longer than 1 hour. The principal researcher will request that interviews be recorded (audio only) in order to facilitate data gathering and subsequent data analysis. Participants retain the right to decline the researcher's request to record an interview. Online questionnaires and face-to-face interviews will take place between March 2022 and March 2023.

Throughout the study, the participants will remain anonymous. Every effort will be made to respect participants' anonymity. The data collected will be analysed by the principal researcher alone. Participants' actual names will be protected. Interview notes and/or transcripts will be held by the principal researcher and stored in a secure, password-protected location on DCU servers. Confidentiality of information can only be protected within the limitations of the law.

The participants have the right to lodge a complaint with the Irish Data Protection Commission or to access their own personal data requesting them to the principal researcher.

Participants have the right to withdraw consent at any time contacting the principal researcher.

There is no risk in taking part in the research study as every effort will be made to conceal the participants' identity and to protect their privacy.

Participants will benefit of a customized training on translation technologies and the professional experience of principal researcher in translation project management and translation technologies training. The outcomes of this study will support translators in their everyday job and will help to outline a set of best practices for the introduction of translation technologies in Public Administration.

Participants may withdraw from the research study at any point. The participation in the project will end, at the point of withdrawal, and data collected till that moment will be held or processed as stated above.

If participants have concerns about this study and wish to contact an independent person, please contact:

The Secretary, Dublin City University Research Ethics Committee
c/o Research and Innovation Support
Dublin City University, Dublin 9.
Tel 01-7008000
e-mail rec@dcu.ie

Appendix D – Questionnaires and interview questions

1st questionnaire

(delivered before starting the training, online, about two weeks to be completed)

Questions	**Answers**				
1. What are your working languages?	French	English	Spanish	German	Other (please specify)
2. Age	30-40	41-50	51-60	61-70	
3. How many years have you been working as a translator?	0-5	6-10	11-15	16-20	
4. How many years have you been working at the Ministry of Justice?	0-5	6-10	11-15	16-20	
5. Did you work as a freelancer or were you an employee in other companies/organisations before being employed at the Ministry of Justice? If yes, where?	(open ended)				
6. How did you specialize in legal translation?	(open ended)				
7. What are your duties at the Ministry of Justice?	(open ended)				
8. What kind of documents do you translate at the Ministry of Justice?	(open ended)				
9. On average, how many words do you translate per week (give total for each language combination)?	(open ended)				
10. Do you work in a team or have close contact with other translators?	(open ended)				
11. List three things that motivate you the most in your work.	(open ended)				
12. What tools do you use in your daily translation work?	(open ended)				
13. Do you attend conferences, workshops, courses or training related to your profession at least once a year?	Yes	No			
14. Do you regularly use CAT tools (translation memories, termbases, etc.)? (If yes, please also answer question 15).					

15. Do you have any specific training in CAT tools?	Yes	No			
16. Have you ever used machine translation (MT)? (If yes, please also answer questions 17, 18, 19 and 20).	Yes	No			
17. What type of MT engine have you used?	Google translator	DeepL tramslator	Reverso	Systran	Other
18. You used the MT engine to translate...	single words	Whole sentences	paragraphs	full document	Other
19. How did you find out about machine translation?	(open ended)				
20. What are the pros and cons of machine translation?	(open ended)				
Do you agree with the following?					
1. I have the resources/facilities I need to do my job effectively.	Agree	mostly agree	mostly disagree	disagree	don't know
2. Terminological complexity slows down my job.	Agree	mostly agree	mostly disagree	disagree	don't know
3. Translation technologies could be useful to improve productivity.	Agree	mostly agree	mostly disagree	disagree	don't know
4. Translation technologies could be useful to improve translation quality.	Agree	mostly agree	mostly disagree	disagree	don't know
5. I feel that sometimes deadlines could compromise quality.	Agree	mostly agree	mostly disagree	disagree	don't know
6. My workstation is comfortable.	Agree	mostly agree	mostly disagree	disagree	don't know
7. I am involved in decisions that affect me in my own area of work.	Agree	mostly agree	mostly disagree	disagree	don't know
8. I am proud to tell others about my job.	Agree	mostly agree	mostly disagree	disagree	don't know
9. Completing a complex project successfully motivates me.	Agree	mostly agree	mostly disagree	disagree	don't know
10. Introducing translation technologies into the current workflow could be complex.	Agree	mostly agree	mostly disagree	disagree	don't know
11. Translation technologies could replace translators in their work.	Agree	mostly agree	mostly disagree	disagree	don't know
12. Translators could become dependent upon translation technologies and lose some of their professional skills.	Agree	mostly agree	mostly disagree	disagree	don't know
13. Getting error messages when operating programs makes me anxious.	Agree	mostly agree	mostly disagree	disagree	don't know

14. I am afraid of making mistakes when I use a new program.	Agree	mostly agree	mostly disagree	disagree	don't know
15. I am determined to learn another professional skill.	Agree	mostly agree	mostly disagree	disagree	don't know
Please express your level of satisfaction with the following					
1. Quality of source texts	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
2. Feedback or translation review I receive	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
3. Availability of reference materials and other resources necessary for translation	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
4. Clarity of task descriptions	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
5. Terminology management	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
6. Format of documents to be translated	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
7. Level of autonomy given to make decisions	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
8. Working on challenging and complex tasks	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
9. Ability to perform a wide variety of tasks	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
10. Orientation or training received in new position or new tasks	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
11. Task deadlines	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
12. Relationships with colleagues	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
13. Possibility to choose how to perform tasks or projects assigned to me	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
14. Social recognition of profession	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know
15. The tasks or activities performed for the Ministry of Justice	satisfied	somewhat satisfied	somewhat dissatisfied	dissatisfied	don't know

1st interview questions

(performed at the end of training period)

1. What do you think of the translation technologies you have learnt?
2. How do you think translation technologies can help you?
3. What do you think the problems associated with the use of these technologies might be?
4. What is the main source of satisfaction and what is the main source of frustration?

2nd questionnaire

(to be delivered after 6 months, online, about one week to be completed)

Do you agree with the following?					
1. I would like to use translation assistance software more often in my work.	agree	mostly agree	mostly disagree	disagree	don't know
2. I would like to use terminology management tools more often in my work.	agree	mostly agree	mostly disagree	disagree	don't know
3. I would like to use machine translation more often in my work.	agree	mostly agree	mostly disagree	disagree	don't know
4. I think I would need the support of a specialized person to be able to use translation technologies.	agree	mostly agree	mostly disagree	disagree	don't know
5. I find that the various functions of these translation technologies improve the quality of my work.	agree	mostly agree	mostly disagree	disagree	don't know
6. I think the functions available in these tools are too complex to use.	agree	mostly agree	mostly disagree	disagree	don't know
7. I think most translators can learn to use translation tools very quickly.	agree	mostly agree	mostly disagree	disagree	don't know
8. I think the translation tools are very complicated to use and therefore do not improve the quality of my work.	agree	mostly agree	mostly disagree	disagree	don't know
9. I had to change a lot in the way I do my work in order to use translation tools.	agree	mostly agree	mostly disagree	disagree	don't know
10. I believe that translation tools are not useful for the kind of content I have to translate in my work.	agree	mostly agree	mostly disagree	disagree	don't know
11. After the job shadowing, it was easier to use the tools for translation.	agree	mostly agree	mostly disagree	disagree	don't know
12. Changing the way I work to use technologies for translation makes me anxious/concerned.	agree	mostly agree	mostly disagree	disagree	don't know
13. Now that I have learned how to use translation technologies, I want to deepen my knowledge.	agree	mostly agree	mostly disagree	disagree	don't know
14. I am afraid that translation technologies will replace translators in their work.	agree	mostly agree	mostly disagree	disagree	don't know
15. I am afraid that if I start using translation technologies, I will	agree	mostly agree	mostly disagree	disagree	don't know

become dependent on them and lose some of my professional skills.					
16. Receiving error messages when I use translation technologies makes me anxious.	agree	mostly agree	mostly disagree	disagree	don't know
17. By using translation technologies, I have also discovered other information that is useful for my work.	agree	mostly agree	mostly disagree	disagree	don't know
18. I am afraid of making mistakes when I use translation technologies.	agree	mostly agree	mostly disagree	disagree	don't know
19. I am afraid of various problems potentially associated with translation technologies.	agree	mostly agree	mostly disagree	disagree	don't know
20. I am afraid that translation technologies may lead me to lose my autonomy.	agree	mostly agree	mostly disagree	disagree	don't know
21. I am more efficient when I use translation technologies.	agree	mostly agree	mostly disagree	disagree	don't know
22. The time required to learn how to use translation technologies is longer than the time gained by using them.	agree	mostly agree	mostly disagree	disagree	don't know
23. It is easier for me to work with technologies for translation (in terms of cognitive load).	agree	mostly agree	mostly disagree	disagree	don't know
24. I have more control over my work when I use translation technologies.	agree	mostly agree	mostly disagree	disagree	don't know
25. The feeling of not having full control of translation tools makes me anxious.	agree	mostly agree	mostly disagree	disagree	don't know
26. My translator colleagues think I should use technologies for translation.	agree	mostly agree	mostly disagree	disagree	don't know
27. Translators with experience and skills in translation technologies have a better professional profile.	agree	mostly agree	mostly disagree	disagree	don't know
28. Completing a translation job using learned translation technologies gives me satisfaction.	agree	mostly agree	mostly disagree	disagree	don't know
29. I have been able to adapt translation technologies to my work needs.	agree	mostly agree	mostly disagree	disagree	don't know
30. The introduction of translation technologies has affected interpersonal relationships with colleagues.	agree	mostly agree	mostly disagree	disagree	don't know

31. Translation technologies have changed my approach to work.	Agree	mostly agree	mostly disagree	disagree	don't know
32. When I complete a translation using translation technologies, I feel fatigued.	Agree	mostly agree	mostly disagree	disagree	don't know
33. Do you think special skills are needed to use machine translation?	(open ended)				
34. What does 'appropriate use' of machine translation mean to you?	(open ended)				
35. What do you think are the prerequisites for using machine translation?	(open ended)				

2nd interview questions

(performed after mentoring period)

1. To what extent have translation technologies impacted the nature of your work?
2. What factors influence your decision to utilise translation technology?
3. What factors impede the utilisation of translation technology?
4. Have you ever been satisfied with the use of translation technology? If so, on what occasions?
5. Have you ever felt frustrated when using translation technology?
6. What should be changed to improve the use of translation technology? Do you have any suggestions?
7. What do you expect from the use of translation technology?

3rd questionnaire

(performed at the end of the fieldwork)

Do you agree with the following?					
1. Now that I have learnt the use of translation memories, I would never do without them again.	Agree	mostly agree	mostly disagree	disagree	don't know
2. Systems for creating and managing glossaries are essential for improving my work.	Agree	mostly agree	mostly disagree	disagree	don't know
3. The quality of the trained MT engine is better than I imagined.	Agree	mostly agree	mostly disagree	disagree	don't know
4. I feel that translation technologies are not suitable for the kind of translations I do.	Agree	mostly agree	mostly disagree	disagree	don't know

5. I want to learn more about translation technology every time I discover a new feature.	Agree	mostly agree	mostly disagree	disagree	don't know
6. Translation technologies have useful features for translating documents, but in general I might not use them because I think they do not improve my work.	Agree	mostly agree	mostly disagree	disagree	don't know
7. Learning to use translation tools takes too much time compared to the benefits.	Agree	mostly agree	mostly disagree	disagree	don't know
8. I am very satisfied with the results I have achieved since I started using translation technology.	Agree	mostly agree	mostly disagree	disagree	don't know
9. I find it very useful to have translation memories, glossaries and machine translation in one working environment.	Agree	mostly agree	mostly disagree	disagree	don't know
10. Translation memories and glossaries help me to detect machine translation errors that might be 'hidden' by the fluent style.	Agree	mostly agree	mostly disagree	disagree	don't know
11. It has happened to me that I have not used translation technology for urgent jobs because I was afraid that the programmes would not work properly.	Agree	mostly agree	mostly disagree	disagree	don't know
12. In order to use translation technology, I have to give up my autonomy.	Agree	mostly agree	mostly disagree	disagree	don't know
13. I have learnt to solve small problems caused by translation software and feel satisfied.	Agree	mostly agree	mostly disagree	disagree	don't know
14. I am afraid that machine translation will replace translators.	Agree	mostly agree	mostly disagree	disagree	don't know
15. Participating in this research project has broadened my professional experience.	Agree	mostly agree	mostly disagree	disagree	don't know
16. The problems with converting PDF files demotivated me and I decided not to use translation technology.	Agree	mostly agree	mostly disagree	disagree	don't know
17. Translation memories or machine translation sometimes suggest good translation solutions that I had not thought of.	Agree	mostly agree	mostly disagree	disagree	don't know

18. I found it useful to share translation memories and glossaries with colleagues.	Agree	mostly agree	mostly disagree	disagree	don't know
19. Teamwork is essential to get better results faster when using translation technology.	Agree	mostly agree	mostly disagree	disagree	don't know
20. I do not believe that sharing translation memories and glossaries is useful for the type of translation I do.	Agree	mostly agree	mostly disagree	disagree	don't know
22. I am more efficient when I work alone, without sharing documents, translation memories or glossaries.	Agree	mostly agree	mostly disagree	disagree	don't know
21. Being able to choose which tools to use and when is a source of satisfaction.	Agree	mostly agree	mostly disagree	disagree	don't know
23. I feel that I have contributed to the success of the research project with my professional experience and personal commitment.	Agree	mostly agree	mostly disagree	disagree	don't know
24. I feel that the use of technology for translation can cause me to lose full control over my work.	Agree	mostly agree	mostly disagree	disagree	don't know
25. Using translation technology is easier than I thought it would be at the beginning of the research project.	Agree	mostly agree	mostly disagree	disagree	don't know
26. I had the opportunity to express my opinion about translation technology to my supervisor.	Agree	mostly agree	mostly disagree	disagree	don't know
27. I am not afraid of machine translation because I have found it to be just as useful as other translation tools (e.g. translation memories or glossaries).	Agree	mostly agree	mostly disagree	disagree	don't know
28. The results achieved this year motivate me to use translation technology more and better.	Agree	mostly agree	mostly disagree	disagree	don't know
29. Sharing the difficulties and successes with my colleagues has motivated me to work even harder for the success of the research project.	Agree	mostly agree	mostly disagree	disagree	don't know
30. The opinions of my colleagues have influenced my decision whether or not to use translation technology.	Agree	mostly agree	mostly disagree	disagree	don't know
31. Using translation technology without adequate training	Agree	mostly agree	mostly disagree	disagree	don't know

carries not only linguistic but also work management risks.					
32. I could now describe the risks to the Ministry of Justice of misusing untrained machine translation engines.	Agree	mostly agree	mostly disagree	disagree	don't know
33. If you could go back, what would you change in the research project in which you participated?	(open ended)				
34. Has your opinion on translation technology changed in this year?	(open ended)				
35. If you had to match each issue of this design with translation memories, glossaries, machine translation and yourself, what association would you make? Why?	(open ended)				

3rd interview questions

(performed at the end of the fieldwork)

1. If you were asked to explain to someone outside the Ministry of Justice how translation technology has changed your work, what would you choose to talk about?
2. Has the use of translation technology ever forced you to make a translation choice that was correct but did not reflect your style? How did you feel about that?
3. Would you be able to explain where machine translation results come from and why they are not always reliable?
4. Based on your personal experience and the changes you have witnessed, how do you think you will be using translation memories, glossaries and machine translation in 3-year time?
5. Are there any translations that you would prefer to do without translation technology? If so, why?
6. Do you think it is always useful to use a combination of computer and machine translation, or are there cases where it is better to avoid using machine translation?
7. Give one positive and one negative aspect of the experiment you took part in.
8. Use 3 adjectives to describe your experience of taking part in this experiment.

Questionnaires and interview questions (Italian version)

1st questionnaire

Domande	**Risposte**

1. Quali sono le tue lingue di lavoro?	Francese	Inglese	Spagnolo	Tedesco	Altro (specificare)
2. Età	30-40	41-50	51-60	61-70	
3. Da quanti anni lavori come traduttrice?	0-5	6-10	11-15	16-20	
4. Da quanti anni lavori presso il Ministero della Giustizia?	0-5	6-10	11-15	16-20	
5. Hai lavorato come libera professionista o sei stata dipendente di altre aziende/organizzazioni prima di essere assunta al Ministero della Giustizia? Se sì, quali?	(risposta aperta)				
6. Come sei arrivata a specializzarti nel settore legale?	(risposta aperta)				
7. Quali sono i tuoi compiti al Ministero della Giustizia?	(risposta aperta)				
8. Che tipo di documenti traduci al Ministero della Giustizia?	(risposta aperta)				
9. Quante parole alla settimana traduci in media (specificare il totale per ogni combinazione linguistica)?	(risposta aperta)				
10. Lavori in gruppo o mantieni uno stretto	(risposta aperta)				

contatto con le altre traduttrici?					
11. Elenca 3 cose che ti motivano di più nel tuo lavoro.	(risposta aperta)				
12. Quali strumenti utilizzi nei compiti di traduzione che svolgi quotidianamente?	(risposta aperta)				
13. Partecipi a conferenze, workshop, corsi o sessioni di formazione relativi alla tua professione almeno una volta all'anno?	Sì	No			
14. Utilizzi regolarmente strumenti CAT (memorie di traduzione, termbase, ecc.)? (Se sì, rispondi anche alla domanda n. 15).	Sì	No			
15. Hai una formazione specifica sugli strumenti CAT?	Sì	No			
16. Hai mai usato la traduzione automatica (MT)? (Se sì, rispondi anche alle domande n. 17, 18, 19 e 20).	Sì	No			
17. Che tipo di motore di traduzione automatica hai usato?	Google translator	DeepL tramslator	Reverso	Systran	Altro

18. Hai usato il motore di traduzione automatica per tradurre…	parole singole	intera frase	paragrafo	intero documento	Altro
19. Come hai scoperto la traduzione automatica?	(risposta aperta)				
20. Quali sono i vantaggi e gli svantaggi della traduzione automatica?	(risposta aperta)				
Quanto sei d'accordo con le seguenti affermazioni?					
1. Ho le risorse/gli strumenti di cui ho bisogno per fare il mio lavoro in modo efficace.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
2. La complessità terminologica mi rallenta nel lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
3. Le tecnologie per la traduzione potrebbero essere utili per migliorare la produttività.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
4. Le tecnologie per la traduzione potrebbero essere utili per migliorare la qualità della traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
5. Credo che a volte le scadenze ravvicinate possano compromettere la qualità della traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

6. La mia postazione di lavoro è confortevole.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
7. Sono coinvolta nelle decisioni che mi riguardano nella mia area di lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
8. Sono orgogliosa di parlare agli altri del mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
9. Completare con successo un progetto complesso mi motiva.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
10. Introdurre le tecnologie per la traduzione nell'attuale flusso di lavoro potrebbe essere complesso.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
11. Le tecnologie per la traduzione potrebbero sostituire i traduttori nel loro lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
12. I traduttori potrebbero diventare dipendenti dalle tecnologie per la traduzione e perdere alcune delle loro competenze professionali.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

13. Ricevere messaggi di errore quando utilizzo programmi nuovi mi rende ansiosa.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
14. Temo di fare errori quando uso un programma nuovo.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
15. Sono determinata a imparare un'altra abilità professionale.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
Esprimi il tuo livello di soddisfazione riguardo a:					
1. Qualità dei testi di partenza	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
2. Feedback o revisione della traduzione che ricevo	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
3. Disponibilità di materiali di riferimento e altre risorse necessarie per la traduzione	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
4. Chiarezza delle descrizioni delle attività da svolgere	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
5. Modalità di gestione della terminologia	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo,

					né in disaccordo
6. Formati dei documenti da tradurre	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
7. Livello di autonomia data per prendere decisioni	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
8. Lavorare su compiti impegnativi e complessi	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
9. Possibilità di eseguire un'ampia varietà di attività	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
10. Orientamento o formazione ricevuta in caso di nuova posizione o nuovi compiti	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
11. Scadenze di consegna	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
12. Relazione con i colleghi	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
13. Possibilità di decidere come svolgere le attività	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo,

o i progetti a me assegnati					né in disaccordo
14. Riconoscimento sociale della mia professione	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo
15. Attività e progetti che svolgo all'interno del Ministero della Giustizia	molto soddisfatta	abbastanza soddisfatta	abbastanza insoddisfatta	molto insoddisfatta	né d'accordo, né in disaccordo

1st interview questions

1. Cosa ne pensi delle tecnologie per la traduzione che hai imparato?
2. Come pensi che le tecnologie per la traduzione possano aiutarti?
3. Quali pensi che possano essere i problemi legati all'uso di queste tecnologie?
4. Qual è la principale fonte di soddisfazione e quale di frustrazione?

2nd questionnaire

Quanto sei d'accordo con le seguenti affermazioni?					
1. Vorrei usare più spesso software per l'assistenza alla traduzione nel mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
2. Vorrei usare più spesso strumenti di gestione della terminologia nel mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

3. Vorrei usare più spesso la traduzione automatica nel mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
4. Penso che avrei bisogno dell'assistenza del supporto informatico per poter utilizzare le tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
5. Trovo che le varie funzioni delle tecnologie per la traduzione migliorino la qualità del mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
6. Penso che le funzioni disponibili negli strumenti per la traduzione siano troppo complesse da usare.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
7. Penso che la maggior parte dei traduttori possa imparare a usare gli strumenti per la traduzione molto rapidamente.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
8. Penso che gli strumenti per la traduzione siano molto complicati da usare e per questo non migliorano la qualità del mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
9. Ho dovuto cambiare molto le modalità con cui svolgo il mio lavoro per poter utilizzare gli strumenti per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

10. Credo che gli strumenti per la traduzione siano inutili per il tipo di contenuti che devo tradurre nel mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
11. Dopo l'affiancamento è stato più facile usare gli strumenti per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
12. Dover cambiare il modo di lavorare per usare le tecnologie per la traduzione è fonte di insoddisfazione per me.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
13. Adesso che ho imparato a usare le tecnologie per la traduzione desidero approfondire le mie conoscenze.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
14. Temo che le tecnologie per la traduzione possano sostituire i traduttori nel loro lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
15. Credo che se comincio a usare le tecnologie per la traduzione diventerò dipendente da esse e perderò alcune delle mie competenze professionali.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
16. Ricevere messaggi di errore quando utilizzo le tecnologie per la traduzione è frustrante.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

17. Usando le tecnologie per la traduzione ho scoperto altre informazioni utili per il mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
18. Temo di fare errori quando uso le tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
19. Temo che possano verificarsi vari problemi potenzialmente associati all'uso delle tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
20. Temo che le tecnologie per la traduzione possano portarmi a perdere la mia autonomia.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
21. Sono più efficiente quando uso le tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
22. Il tempo richiesto per imparare a usare le tecnologie per la traduzione è superiore rispetto a quello che si guadagna utilizzandole.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
23. Lavorare con le tecnologie per la traduzione riduce il carico cognitivo richiesto per svolgere l'attività.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

24. Ho maggiore controllo sul mio lavoro quando uso le tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
25. La sensazione di non avere il pieno controllo degli strumenti per la traduzione mi preoccupa.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
26. I colleghi traduttori pensano che dovrei usare le tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
27. I traduttori con esperienza e abilità nelle tecnologie per la traduzione hanno un profilo professionale migliore.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
28. Completare un lavoro di traduzione usando le tecnologie per la traduzione imparate è fonte di soddisfazione per me.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
29. Sono riuscita ad adattare le tecnologie per la traduzione alle mie esigenze lavorative.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
30. L'introduzione delle tecnologie per la traduzione ha influito sulle relazioni interpersonali con le colleghe.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

31. Le tecnologie per la traduzione hanno cambiato il mio approccio al lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
32. Quando completo una traduzione usando le tecnologie per la traduzione mi sento più affaticata.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
33. Pensi che siano necessarie competenze particolari per usare la traduzione automatica?	(risposta aperta)				
34. Cosa significa per te 'uso appropriato' della traduzione automatica?	(risposta aperta)				
35. Quali sono secondo te le condizioni indispensabili per utilizzare la traduzione automatica?	(risposta aperta)				

2nd interview questions

1. Quali cambiamenti hanno portato le tecnologie per la traduzione nel tuo lavoro?
2. Cosa ti invoglia a usare le tecnologie per la traduzione?
3. Cosa ti impedisce di usare le tecnologie per la traduzione?
4. Ti è capitato di sentirti soddisfatta utilizzando le tecnologie per la traduzione? Se sì, in che occasione?
5. L'uso delle tecnologie per la traduzione ti ha mai causato frustrazione?
6. Cosa dovrebbe cambiare per migliorare l'utilizzo delle tecnologie per la traduzione? Hai delle proposte?
7. Cosa ti aspetti dall'uso delle tecnologie per la traduzione?

3rd questionnaire

Quanto sei d'accordo con le seguenti affermazioni?					
1. Adesso che ho imparato a usare le memorie di traduzione non vorrei più lavorare senza.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
2. Disporre di sistemi per la creazione e gestione dei glossari è fondamentale per migliorare il mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
3. La qualità del motore di traduzione automatica addestrato è migliore di quanto immaginassi.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
4. Penso che le tecnologie per la traduzione non siano adatte al tipo di traduzioni di cui mi occupo.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
5. Ogni volta che scopro una nuova funzione delle tecnologie per la traduzione desidero approfondire ancora di più la mia conoscenza dei programmi.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
6. Le tecnologie per la traduzione dispongono di funzioni utili per tradurre i documenti, ma in generale potrei non usarle perché ritengo che non migliorino il mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

7. Imparare a usare gli strumenti per la traduzione richiede troppo tempo rispetto ai vantaggi che si ottengono.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
8. Sono molto soddisfatta dei risultati che ho ottenuto da quando ho iniziato a lavorare con le tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
9. Trovo molto utile disporre contemporaneamente di memorie di traduzione, glossari e traduzione automatica in un unico ambiente di lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
10. Le memorie di traduzione e i glossari mi aiutano a individuare gli errori della traduzione automatica che potrebbero essere "mascherati" dallo stile scorrevole.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
11. Mi è capitato con lavori urgenti di scegliere di non usare le tecnologie per la traduzione per paura che i programmi non funzionassero correttamente.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
12. Per usare le tecnologie per la traduzione devo rinunciare alla mia autonomia.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

13. Ho imparato a risolvere piccoli problemi causati dai programmi di traduzione e mi sento soddisfatta.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
14. Temo che la traduzione automatica possa sostituire i traduttori.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
15. Partecipare a questo progetto di ricerca ha valorizzato la mia esperienza professionale.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
16. I problemi legati alla conversione dei file PDF mi hanno demotivata e ho deciso di non usare le tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
17. Le memorie di traduzione o la traduzione automatica a volte mi suggeriscono valide soluzioni traduttive a cui non avevo pensato.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
18. Ho trovato utile condividere le memorie di traduzione e i glossari con le colleghe.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
19. Lavorare in squadra è fondamentale per ottenere risultati migliori più rapidamente quando si usano le tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

20. Non credo che condividere le memorie di traduzione e i glossari sia utile per il tipo di traduzioni di cui mi occupo.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
22. Sono più efficiente quando lavoro da sola senza condividere i documenti, le memorie di traduzione o i glossari.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
21. La possibilità di scegliere quali strumenti usare e quando è motivo di soddisfazione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
23. Sento di aver contribuito alla buona riuscita del progetto di ricerca con la mia esperienza professionale e il mio impegno personale.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
24. Credo che usare le tecnologie per la traduzione possa farmi perdere il pieno controllo del mio lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
25. Usare le tecnologie per la traduzione è più semplice di quanto credessi all'inizio del progetto di ricerca.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
26. Ho avuto l'opportunità di esprimere la mia opinione sulle tecnologie per la traduzione con il mio responsabile.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

27. Non temo la traduzione automatica perché ho scoperto che è uno strumento utile come altri strumenti per la traduzione (ad esempio, le memorie di traduzione o i glossari).	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
28. I risultati raggiunti in questo anno mi motivano a usare ancora di più e ancora meglio le tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
29. Condividere le difficoltà e i successi con le colleghe mi ha invogliata a impegnarmi ancora di più nella buona riuscita del progetto di ricerca.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
30. L'opinione delle colleghe ha influito sulla mia scelta di usare o meno le tecnologie per la traduzione.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
31. Usare le tecnologie per la traduzione senza un'adeguata formazione comporta dei rischi non solo linguistici, ma anche di gestione del lavoro.	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo
32. Adesso saprei descrivere quali sono i rischi causati dall'uso improprio di motori di traduzione automatica non addestrati	molto d'accordo	abbastanza d'accordo	abbastanza in disaccordo	molto in disaccordo	né d'accordo, né in disaccordo

per il Ministero della Giustizia.					
33. Se potessi tornare indietro, cosa cambieresti nel progetto di ricerca a cui hai partecipato?	(risposta aperta)				
34. La tua opinione sulle tecnologie per la traduzione è cambiata in questo anno?	(risposta aperta)				
35. Se dovessi far corrispondere a ogni numero di questo disegno memorie di traduzione, glossari, traduzione automatica e te stessa, che associazione faresti? Perché?	(risposta aperta)				

3rd interview questions

1. Se ti venisse chiesto di spiegare a qualcuno al di fuori del Ministero della Giustizia come le tecnologie per la traduzione hanno cambiato il vostro lavoro, di cosa sceglieresti di parlare?
2. L'uso delle tecnologie per la traduzione ti ha mai obbligata a fare una scelta traduttiva che era corretta ma non rispecchiava il tuo stile? Come ti sei sentita?
3. Saresti in grado di spiegare da dove provengono i risultati della traduzione automatica e perché non sono sempre affidabili?
4. Come pensi che userete le memorie di traduzione, i glossari e la traduzione automatica tra 3 anni in base alla tua esperienza personale e ai cambiamenti di cui sei stata testimone?
5. Ci sono delle traduzioni che preferisci fare senza le tecnologie per la traduzione? Perché?
6. Pensi che sia sempre utile usare la combinazione traduzione assistita e automatica, o ci sono dei casi in cui è meglio evitare di usare la traduzione automatica?
7. Un aspetto positivo e uno negativo dell'esperimento a cui hai partecipato.
8. Usa 3 aggettivi per descrivere l'esperienza che hai vissuto partecipando a questo esperimento

Appendix E – Sources of satisfaction and frustration before the use of technologies

This table reports the main summarized ideas expressed by each participant during the first interview after training in Phase I in response to the question n. 4: "What is the main source of satisfaction and what is the main source of frustration?". For clarity reasons, the same idea repeated by many participants was expressed using the same wording and not reporting exactly the expressions used by participants.

	Source of **satisfaction**	Source of **frustration**
1	• possibility to increase leveraging with a bigger TM • improve skills with mentoring	• PDF format • time pressure for daily deliveries • uncertainty on real advantages of using tools
2	• working in a more organised way • retrieve shared linguistic data	• need to change way of working • too much information to keep track
3	• leveraging previous translations • no duplication of efforts • reduction in time and costs (satisfaction as a taxpayer) • fundamental mentoring and also learning in groups • learning curve very steep, sharing frustration helps	• insufficient knowledge of the tools • need to change mentality and way of working • Italian source text written in long, complex sentences
4	• speeding up job	• non-immediate empathy with the mechanisms underlying the tools
5	(don't say)	• source file format causing problems to tool • resistance to change from some colleagues • difficulty in reaching unanimity on linguistic solutions
6	• sharing of knowledge • leveraging previous translations • speeding up job	• gap between theoretical understanding of tool and slow practical learning
7	• new and modern way of working	• inability to see the full implications of this new way of working

8	• leveraging previous translations	• still not able to prepare glossaries
9	• leveraging previous translations • sharing linguistic data	(don't say)
10	• acquiring new skills	• uncertainty about tool usefulness
11	(don't say)	• effort required on our part in advance for the alignment of the texts (a rather cumbersome process) and the creation of glossaries (to be cleaned up and revised), without having the time to devote to them
12	• avoid repetitive tasks	• lack of time • disproportion between staff units, the amount of work that needs to be done to prepare TMs and TBs, and the lack of understanding of the complexity of all this on the part of our managers
13	• professional exchange with a person specialized in translation technologies	• we are not freelance translators who only have to produce words as quickly as possible, but employees of PA • this technology requires a great deal of effort with uncertain results, especially for those who have been working for about thirty years now with a consolidated methodology and who are inserted in binding work rhythms • percentage or number of words I would find already translated in a draft translation produced with TM is a bit reductive (and also a bit frustrating) with respect to the activity of translating, it seems to me potentially reductive and therefore dangerous
14	• speeding up job • avoid repetitive tasks	• amount of time required for alignment • cumbersome and unintuitive to manage some processes
15	(not enough elements to evaluate for technical problems)	(not enough elements to evaluate for technical problems)

16	(not enough elements to evaluate for technical problems)	(not enough elements to evaluate for technical problems)
17	• speeding up job	• very complex tools • lack of time
18	• speeding up job • leveraging previous translations	• need more practice • lack of time
19	• leveraging previous translations	• steep learning curve
20	• leveraging previous translations	• still not able to prepare glossaries
21	• leveraging previous translations	• possible to leverage only repetitive text
22	• learn all the functions of the tools	• decide what to do with the tools learned