

Aalborg Universitet



(Post-)Editing - A Workplace Study of Translator-Computer Interaction at TextMinded Danmark A/S

Bundgaard, Kristine

Publication date:
2017

[Link to publication from Aalborg University](#)

Citation for published version (APA):
Bundgaard, K. (2017). *(Post-)Editing - A Workplace Study of Translator-Computer Interaction at TextMinded Danmark A/S*.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.



SCHOOL OF BUSINESS AND SOCIAL SCIENCES
AARHUS UNIVERSITY

(POST-)EDITING
– A WORKPLACE STUDY OF TRANSLATOR-COMPUTER
INTERACTION AT TEXTMINDED DANMARK A/S

PhD dissertation

Kristine Bundgaard

Main supervisor: Tina Paulsen Christensen
Co-supervisor: Anne Schjoldager

Aarhus BSS
Aarhus University
Department of Management
2017

Tak

Da jeg startede på min færd mod ph.d.-en, var der en masse, jeg vidste, jeg ville lære noget om. Det gjorde jeg også. Men jeg lærte også en masse andet, både på det faglige og det personlige plan. Det skylder jeg mange mennesker tak for.

Først en stor tak til mine vejledere, Tina og Anne. Tak for altid yderst kompetent og anerkendende vejledning og for jeres hyggelige selskab. Tak, Tina, for din måde at være på, for din altid konstruktive tilgang, og for, at du altid har været ambitiøs på mine vegne.

En stor tak til TextMinded, som inviterede mig indenfor og dermed gjorde projektet muligt. En særligt stor tak til Robert, Britta, Torben, Birgitte og ikke mindst de otte oversættere, som deltog i det eksperimentelle studie. Tak for jeres interesse og åbenhed. Jeg havde et meget givende og behageligt ophold hos jer.

En stor tak til Antoinette for hjælp med korrektur og for dit altid søde væsen. Tak til Anders fra Analytics Group for kompetent sparring om statistikken og tak til Melanie for hjælp med transskribering. Thank you, Sharon (O'Brien) and Hanna (Risku), for welcoming me to your departments during my visits and for your valuable input.

Tak til ph.d.-gruppen og mange andre gode kolleger på det nu tidligere BCOM. Tak for hyggelige og inspirerende snakke og for jeres interesse. Tak til Karen for at holde kontakt med mig i årene inden ph.d.-en og for din hjælp, inden jeg startede. Tak til Helle (V. Dam) for dit engagement og din altid positive indstilling. Tak til Casper: Du gjorde det sidste års tid meget bedre og sjovere. Tak for gode ritualer, utallige kopper latte og for din altid betænksomme måde at være på. Tak til Christiane for vores fællesskab både inden for og uden for murene.

En særligt stor tak til Matilde, Rikke og Ulf: I er den største del af årsagen til, at det har været så sjovt og rart at komme på arbejde de sidste år. I er tre fantastiske mennesker og skønne venner. Matilde, tak for hyggelige morgenmadsaftaler, tak for dejlige ikkefaglige og faglige snakke og tak for din omsorgsfuldhed. Rikke, tak for, at du på alle måder har været den bedste kontormakker, man kan forestille sig, og for, at du er en skøn veninde. Ulf, tak for din måde at være på og for dit venskab. Jeg glæder mig til mange timer med jer i fremtiden.

Tak Stine, fordi du er min bedste ven.

Tak til min og vores familie for hjælp og altid hyggeligt samvær. En særligt stor tak til mine forældre: Selvom I er (for) langt væk, så står I altid klar, når jeg og vi har brug for jer.

Den allerstørste tak er til de tre vigtigste i mit liv. Arthur og Nelson, I er en gave, og I sætter alting i perspektiv. Tak Mikkel, min anden halvdel, for støtte og aldrig vaklende tro på mig og på os. Du ved, hvor vigtig du er.

Kristine

Table of contents

List of tables	v
List of figures	vii
List of abbreviations	viii
Chapter 1. Introduction	2
1.1 Why Machine Translation-assisted Translation Memory translation?	2
1.2 Purpose statement and research questions	3
1.3 Overall research design	4
1.4 Contribution	4
1.5 Delimitation	5
1.6 Thesis structure	5
Chapter 2. Introducing Machine Translation-assisted Translation Memory translation.....	8
2.1 Translation technology	8
2.2 Machine Translation	10
2.3 Translation Memory	12
2.4 Machine Translation-assisted Translation Memory translation	15
Chapter 3. Theoretical framework.....	18
3.1 Translation Studies	18
3.2 Translation Process Research	20
3.2.1 Definitions of the translation process.....	20
3.2.2 The context-dependent translation process.....	22
3.2.3 Translation as Human-Computer Interaction	24
3.2.4 Machine Translation-assisted Translation Memory translation as Translator-Computer Interaction	27
3.3 Methods in Translation Process Research	28
3.3.1 Context-oriented Translation Process Research methods.....	29
3.3.2 Traditional Translation Process Research methods	29
3.4 Literature review	33
3.4.1 Translator-Computer Interaction as an authentic context-dependent activity.....	34
3.4.2 Experimental studies of Machine Translation-assisted Translation Memory translation ...	40
3.4.2.1 Editing speed.....	40
3.4.2.2 Amount of editing	50
3.4.2.3 Quality	52
3.4.2.4 Self-revision and review	54
3.4.3 Synthesis and research gaps	56
Chapter 4. Methodology	61
4.1 Pragmatism	61
4.2 Mixed methods research	63
4.2.1 Pragmatism and mixed methods in Translation Studies.....	64
4.3 Mixed methods research design of this thesis	65
4.3.1 The workplace study at TextMinded Danmark A/S	67
4.3.1.1 The contextual study.....	68
4.3.1.1.1 Methods for data collection	68
4.3.1.1.1.1 Observation	68
4.3.1.1.1.2 Semi-structured interviews	70
4.3.1.1.1.3 Document collection.....	70
4.3.1.1.2 The researcher's role.....	70
4.3.1.1.3 The experimental study.....	71
4.3.1.1.3.1 The Machine Translation-assisted Translation Memory translation part	72
4.3.1.1.3.1.1 The translators.....	73

4.3.1.1.3.1.2 The Machine Translation-assisted Translation Memory tool	74
4.3.1.1.3.1.3 The source texts	75
4.3.1.1.3.1.4 Conducting the Machine Translation-assisted Translation Memory translation part & methods for data collection	77
4.3.1.1.3.1.4.1 Step 1: Preparations	78
4.3.1.1.3.1.4.1.1 Testing the experimental setup	79
4.3.1.1.3.1.4.1.2 Instructions	79
4.3.1.1.3.1.4.2 Step 2: Translation process	80
4.3.1.1.3.1.4.2.1 Keystroke logging	80
4.3.1.1.3.1.4.2.2 Screen recording	81
4.3.1.1.3.1.4.2.3 Observation	81
4.3.1.1.3.1.4.3 Step 3: Retrospective interview	82
4.3.1.1.3.1.4.4 Step 4: Questionnaire	83
4.3.1.1.3.2 The review part	84
4.3.1.1.3.3 Collected data	85
4.3.2 Methods for data analysis	86
4.3.2.1 The observer effect	87
4.3.2.2 Transcription of interviews	89
4.3.3 Ethical considerations	91
Chapter 5. Analyses and results	93
5.1 Contextualization: Setting the scene	93
5.1.1 Considerations about the implementation of Machine Translation at TextMinded	93
5.1.2 Workflow context	94
5.1.3 The translators: Individual differences	97
5.2 Accept/Reject/Revise: Introduction	99
5.2.1 Analytical method	99
5.2.1.1 Limitations	101
5.2.2 Results	101
5.2.2.1 Accept/Reject/Revise: Distribution	102
5.2.2.2 Accept/Reject/Revise: Characterizing the interaction	109
5.2.2.2.1 The <i>accept</i> category	110
5.2.2.2.1.1 Process examples	114
5.2.2.2.2 The <i>reject</i> category	118
5.2.2.2.2.1 Process examples	125
5.2.2.2.3 The <i>revise</i> category	130
5.2.2.2.3.1 Match-internal and match-external revision: Distribution	131
5.2.2.2.3.2 Match-internal revision	138
5.2.2.2.3.2.1 Process examples	139
5.2.2.2.3.3 Match-external revision	144
5.2.2.2.3.3.1 Match-external actions: A combined picture	145
5.2.2.2.3.3.2 Match-external actions: Individual differences and process examples	148
5.2.3 Synthesis and discussion	172
5.3 Editing speed: Introduction	178
5.3.1 Analytical method	178
5.3.1.1 Time measurement	179
5.3.1.1.1 Analytic criteria	180
5.3.1.1.2 Exclusion of segments from the analysis	182
5.3.1.1.3 Words included in analysis	183
5.3.1.2 Limitations	184
5.3.2 Results	185
5.3.2.1 Total time spent on the editing phase	185
5.3.2.2 Editing speed in the different match types	187
5.3.3 Synthesis and discussion	190
5.4 Linear or non-linear editing: Introduction	192
5.4.1 Analytical method	192

5.4.1.1 Limitations.....	193
5.4.2 Results.....	193
5.4.3 Synthesis and discussion.....	199
5.5 Checking: Introduction	200
5.5.1 Analytical method.....	201
5.5.1.1 Limitations.....	202
5.5.2 Results.....	203
5.5.2.1 (Non-)Presence of a checking phase	203
5.5.2.2 Essential and preferential changes implemented during the checking phase.....	205
5.5.3 Synthesis and discussion.....	209
5.6 Amount of editing: Introduction.....	210
5.6.1 Analytical method.....	211
5.6.1.1 Limitations.....	211
5.6.2 Results.....	212
5.6.2.1 Average HTER scores for match types.....	216
5.6.2.2 Amount of editing and editing speed.....	220
5.6.3 Synthesis and discussion.....	221
5.7 Review: Introduction	222
5.7.1 Analytical method.....	222
5.7.1.1 Limitations.....	223
5.7.2 Results.....	223
5.7.2.1 Time spent on review (self-reported)	224
5.7.2.2 Essential and preferential changes implemented during review	224
5.7.3 Synthesis and discussion.....	227
5.8 Translator Attitudes to TCI: Introduction	228
5.8.1 Analytical method.....	228
5.8.1.1 Limitations.....	231
5.8.1.2 Presentation of results	232
5.8.2 Results.....	233
5.8.2.1 Favour towards TCI	233
5.8.2.2 Disfavour towards TCI	234
5.8.2.2.1 Specific MT output is not useful	234
5.8.2.2.2 MT is generally not useful	239
5.8.2.2.3 MT impacts negatively on cognitive processes	241
5.8.2.2.4 Concordance search in the TM is not useful	243
5.8.2.3 The future	244
5.8.3 Synthesis and discussion.....	244
Chapter 6. Discussion and conclusion	249
6.1 A condensed reading of the thesis	249
6.1.1 Overall synthesis of the findings	250
6.2 Discussion	254
6.2.1 Machine Translation-assisted Translation Memory: A complex process of Translator-Computer Interaction	254
6.2.2 Machine Translation in a Translation Memory context.....	255
6.2.3 Match-external revision: Potential indicator of resistance and cognitive friction.....	256
6.2.4 Individual differences: Potential indicators of individual translation styles	257
6.3 Limitations	258
6.3.1 Individual differences and their potential impact on the findings.....	259
6.4 Contribution	260
6.4.1 Didactic applicability	261
6.4.2 Methodological contribution	261
6.4.3 Professional applicability	263
6.4.4 Design applicability	263
6.5 2013 vs. 2016: A brief update.....	263
6.6 Avenues for further research	264
6.7 Final remarks	266

7. Summary in English	267
8. Resumé på dansk	269
9. List of appendices.....	271
10. References	272

APPENDICES

Appendix 1. Source text and matches - FAQ	287
Appendix 2. Source text and matches - Newsletter	290
Appendix 3. Instructions for experiment.....	292
Appendix 4. Post-experimental questionnaire	293
Appendix 5. Reference text for the FAQ text	296
Appendix 6. Process examples with parts of retrospective interviews	300
Appendix 7. Match-external actions for all translators	323
Appendix 8. Changes implemented during the checking phase.....	331
Appendix 9. Changes implemented during review.....	337

List of tables

Table 1. The translators.....	73
Table 2. Distribution of words and segments between match types in the two source texts	76
Table 3. Time slots for the MT-assisted TM translation part of the experimental study	78
Table 4. Duration of retrospective interviews.....	83
Table 5. Reviewers and assigned translations.....	85
Table 6. Individual differences between translators	98
Table 7. Accept/reject/revise for each translator - FAQ text	104
Table 8. Accept/reject/revise for all translators - FAQ text.....	104
Table 9. Accept/reject/revise for each translator - Newsletter	108
Table 10. Accept/reject/revise for all translators - Newsletter.....	108
Table 11. Accepted 100% matches - Examples: Segments 28 and 31 - FAQ text	110
Table 12. Accepted 95-99% matches - FAQ text	111
Table 13. Accepted 75-84% match - FAQ text.....	112
Table 14. Accepted MT matches - FAQ text	112
Table 15. Accepted 100% matches - Newsletter	113
Table 16. Accepted 85-94% and 70-74% matches - Newsletter.....	113
Table 17. Accepted MT matches - Newsletter	114
Table 18. Rejection type for all translators - FAQ text	119
Table 19. Rejected 95-99% matches - FAQ text	119
Table 20. Rejected 85-94% matches - FAQ text	119
Table 21. Rejected 75-84% match - FAQ text.....	120
Table 22. Rejected 70-74% matches - FAQ text	120
Table 23. Rejected MT matches - FAQ text	121
Table 24. Rejection type for all translators - Newsletter.....	123
Table 25. Rejected 75-84% matches - Newsletter.....	123
Table 26. Rejected MT matches - Newsletter	124
Table 27. Examples of MT matches - Newsletter	124
Table 28. Revise category: match-internal and match-external revision for each translator - FAQ text	133
Table 29. Revise category: match-internal and match-external revision for all translators - FAQ text.....	133
Table 30. Revise category: match-internal and match-external revision for each translator - Newsletter	137
Table 31. Revise category: match-internal and match-external revision for all translators - Newsletter	137
Table 32. AutoSuggest suggestions during match-internal revision - FAQ text	139
Table 33. AutoSuggest suggestions during match-internal revision - Newsletter.....	139
Table 34. Match-external actions for all translators - FAQ text	147
Table 35. Match-external actions for all translators - Newsletter	147
Table 36. Segments 4 and 5 - Newsletter.....	170
Table 37. Number of words included in analysis of editing speed	184
Table 38. Total time spent on the editing phase - FAQ text and Newsletter	186
Table 39. Editing speed (in words per minute) - FAQ text	187
Table 40. Editing speed (in words per minute) - Newsletter.....	187
Table 41. Minutes spent on checking - FAQ text.....	203
Table 42. Minutes spent on checking - Newsletter	203
Table 43. Essential and preferential changes - FAQ text.....	205
Table 44. Essential and preferential changes - Newsletter	205
Table 45. Average HTER scores per segment - FAQ text	213
Table 46. Average HTER scores per segment - Newsletter	214
Table 47. Average HTER scores for match types - FAQ text	217
Table 48. Average HTER scores for match types - Newsletter	217
Table 49. Time spent on review - FAQ text	224
Table 50. Time spent on review - Newsletter.....	224

Table 51. Essential and preferential changes - FAQ text	225
Table 52. Essential and preferential changes - Newsletter	225
Table 53. Key findings of this thesis	266

List of figures

Figure 1. Hutchins and Somers' spectrum of translation methods (based on Hutchins and Somers 1992, p.148)	9
Figure 2. Holmes' map (borrowed from Chesterman 2009, p.14)	18
Figure 3. The task-artefact cycle (based on Carroll et al. 1991, p.80)	25
Figure 4. Top-down approach in the metaphysical paradigm (based on Jensen 2013, p.58)	62
Figure 5. The central role of the research interest in pragmatism (based on Jensen 2013, p.59)	63
Figure 6. Embedded mixed methods design of this thesis	66
Figure 7. Pretranslation process (inspired by Mesa-Lao 2015, p.4)	74
Figure 8. SDL Trados Studio 2011 interface.....	75
Figure 9. Structure of analyses in Chapter 5	86
Figure 10. The observer effect - answers to question 12 in the post-experimental questionnaire	89
Figure 11. Transcription symbols	91
Figure 12. Translation workflow at TextMinded	95
Figure 13. Translator choices in the editing phase.....	101
Figure 14. Accept/reject/revise for match types and all translators - FAQ text.....	106
Figure 15. Accept/reject/revise for match types and all translators - Newsletter	109
Figure 16. Process example 8-NL-E-22 - Consultation of Web page	130
Figure 17. Total use of match-internal and match-external revision - FAQ text	135
Figure 18. Total use of match-internal and match-external revision - Newsletter	138
Figure 19. Match-external actions in revised matches.....	145
Figure 20. Match-external actions for each individual translator - FAQ text (Number of matches revised by means of match-external revision / match-external actions)	149
Figure 21. Match-external actions for each individual translator - Newsletter (Number of matches revised by means of match-external revision / match-external actions)	150
Figure 22. Process example 20-FAQ-E-61 - Google search.....	161
Figure 23. Process example 21-NL-D-13 - Web page	163
Figure 24. Process example 23-NL-A-3 - Online dictionary	168
Figure 25. The Framebar in BB FlashBack Express	180
Figure 26. Criteria for identifying start and end times for editing segments using screen recordings	181
Figure 27. Total time spent on the editing phase - FAQ text.....	187
Figure 28. Total time spent on the editing phase - Newsletter.....	187
Figure 29. Median editing speeds for the different match types - FAQ text.....	189
Figure 30. Median editing speeds for the different match types - Newsletter	190
Figure 31. (Non)-linearity - FAQ text	195
Figure 32. (Non)-linearity - Newsletter	197
Figure 33. Checking in per cent of total time - FAQ text and Newsletter.....	205
Figure 34. Segment 21, Translator B, FAQ text - MT match	216
Figure 35. Segment 21, Translator A, Newsletter - MT match	216
Figure 36. Match categories and average HTER scores - FAQ text.....	218
Figure 37. Match categories and average HTER scores - Newsletter	219
Figure 38. Template analysis: Final template	231

List of abbreviations

BT	Back Translation
CAT	Computer-Assisted Translation
CM	Context Match
DTP	Desktop Publishing
HCI	Human-Computer Interaction
HTER	Human-Targeted Translation Edit Rate
LSP	Language Service Provider
MT	Machine Translation
NMT	Neural Machine Translation
RBMT	Rule-Based Machine Translation
RQ	Research Question
SMT	Statistical Machine Translation
TCI	Translator-Computer Interaction
TM	Translation Memory
TPR	Translation Process Research
TS	Translation Studies
QA	Quality Assurance

Chapter 1

Introduction

Chapter 1. Introduction

This thesis is concerned with how translators interact with a translation tool that combines Translation Memory (TM) and Machine Translation (MT), a so-called MT-assisted TM translation tool, and with translators' attitudes to that interaction. In this chapter, I shall briefly introduce MT-assisted TM translation and my motivation for exploring this phenomenon. Against this backdrop, the main purpose and research questions of the thesis will be introduced, followed by a description of the overall research design, and contributions and delimitations of the research. The chapter concludes with an overview of the remaining five chapters of the thesis.

1.1 Why Machine Translation-assisted Translation Memory translation?

Due to globalisation and the explosion in digital content during the last decades, the demand for translation has increased significantly. Indeed, in 2009, the European Union estimated an annual growth of 10% in the demand for translation (Rinsche & Portera-Zanotti 2009, p.iii), and in 2016, Common Sense Advisory's annual study of the translation industry found that the demand for language services continues to grow (DePalma et al. 2016). At the same time, deadlines are getting shorter (Bowker 2015, p.89). Traditional human translation cannot meet these challenges, and translation tools are therefore employed to increase productivity (Bowker 2015, p.89; DeCamp & Zetzsche 2015, p.380; Schmitt 2015, p.234; Doherty 2016, p.948). A TM, which enables the recycling of previous human-produced translations, has been the most significant type of translation tool for many years. In recent years, however, as an additional type of translation aid, TM systems have started to incorporate MT, automatic software-produced translation. The uptake of MT is growing (cf. e.g. Gaspari et al. 2015) and, as stated by Christensen and Schjoldager, implementation of advanced translation technology such as TM and MT "seems to be a must in the translation industry" (2016, p.89). The integration of TM with MT is what I shall refer to as MT-assisted TM translation; this type of translation is the central concern of this thesis.

In an MT-assisted TM environment, translators are provided with translation suggestions, so-called matches, for every sentence in the source text. These matches are either retrieved from a TM or are translated by means of an MT system. In MT-assisted TM translation, translators are assumed to switch between editing TM matches and editing MT matches (O'Brien & Moorkens 2014, p.132). As such, technology is strongly embedded in the translation profession and, as stated by Jimenéz-Crespo, "[t]oday, the practice of translation and interpreting cannot be understood independent of the technologies that support it" (2015, p.34). Indeed, translation has been characterized as a form of Human-Computer Interaction (HCI) and is accordingly referred to as Translator-Computer Interaction (TCI) (O'Brien 2012). Despite the undeniable impact of translation technology on translation practice, it has not yet left much of an imprint on Translation Studies (TS) (Munday 2009, p.15; Candel-Mora & Polo 2013, p.2; O'Hagan 2013; Doherty 2016, p.952), the theoretical discipline within which this thesis places itself. However, in the subfield of Translation

Process Research (TPR), a number of studies have focused on how translators use TM and MT.

Although TPR has begun to focus on translators' use of translation tools, and although the integration of MT into TM systems gives rise to a number of questions, as stated by Pym: "when we ask what translators really do with translation memories and machine translation, there is not an enormous amount of empirical data to speak of" (2011b, p.2). We know even less about professional translators' interactions with translation tools in their workplaces (Ehrensberger-Dow 2014, p.357), and several scholars have acknowledged that we need further research in this area (Christensen 2011, p.156; Olohan 2011, pp.353–354; O'Brien 2012, p.116). It is worth noting that there has been a growing tendency in TPR to perceive the exploration of translation processes in the workplace context as a logical consequence of viewing translation as a situated and context-dependent activity. Understanding translation as a situated and context-dependent activity which should be investigated in a workplace context and viewing MT-assisted TM translation as TCI are central to this thesis.

1.2 Purpose statement and research questions

The primary purpose of the thesis is to explore how professional translators interact with an MT-assisted TM system in practice; its secondary purpose is to explore translators' attitudes to this type of TCI.

To attend to these purposes, the following research questions have been devised, with questions 1 through 6 addressing the primary purpose of the thesis and question 7 addressing the secondary purpose:

- RQ1: *To what extent do the translators accept, reject and revise TM and MT matches?*
- RQ1a: *How do the translators interact with the MT-assisted TM tool when they accept, reject and revise matches?*
- RQ2: *How much time do the translators spend on editing TM and MT matches, respectively?*
- RQ3: *Do the translators edit the matches in a linear or non-linear manner?*
- RQ4: *Do the translators check their translations and if so, are changes implemented in this phase essential or preferential?*
- RQ5: *How much do the translators modify TM and MT matches, respectively?*
- RQ6: *How much time do the translators spend on reviewing their colleagues' translations and are changes implemented in this phase essential or preferential?*
- RQ7: *What are the translators' attitudes to TCI in the form of MT-assisted TM translation?*

RQ1-RQ6 relate to different parts of the translation process. RQ1-RQ3 relate to what I term the *editing phase*, RQ4 concerns what I call the *checking phase*, and RQ5 relates to both of these phases. Inspired by Jakobsen's (2002) distinction between the *orientation*, *drafting* and *end revision* phases of the translation process, in this thesis, when I refer to the *editing phase* of the translation process, I refer to the part of the translation process when the translators first evaluate the matches and, if they deem it necessary, modify them (similar to Jakobsen's drafting phase), and when I refer to the *checking phase*, I refer to the translators'

potential final examination of whether the target text is adequate (similar to Jakobsen's end revision phase). The thesis is not concerned with what corresponds to Jakobsen's orientation phase. Jakobsen's model is described in more detail in Section 3.2.1, and I shall elaborate on my definitions of the editing and checking phases in Section 4.3.2. RQ6 concerns what I refer to as *review*, by which I mean the examination of the translation conducted by a person other than the original translator, which I regard as covering both bilingual (comparison of source and target text) and monolingual (review of target text) examination of the translation. RQ7 is not specifically concerned with one or more parts of the translation process, but addresses translators' attitudes to TCI in the form of MT-assisted TM translation.

1.3 Overall research design

The thesis is guided by the worldview of pragmatism. Pragmatism "sidesteps the contentious issues of truth and reality, accepts, philosophically, that there are singular and multiple realities that are open to empirical inquiry and orients itself toward solving practical problems in the "real world"" (Feilzer 2010, p.8). Thus, the primary concern in pragmatism is the research problem and how this may be addressed in the most appropriate way. Against this backdrop, an *embedded mixed methods research design* was chosen based on the perception that a combination of qualitative and quantitative methods best supported the exploration of the research questions. More specifically and based on the viewpoint that the MT-assisted TM translation process is a context-dependent TCI process, the thesis employs an embedded mixed methods research design consisting of a workplace study at a large Danish Language Service Provider (LSP), TextMinded Danmark A/S.¹ In the workplace study, a contextual study and an experimental study are embedded.

1.4 Contribution

In light of the increasing integration of MT with TM in the translation industry, it is relevant and interesting to explore translators' interactions with this technology as well as their attitudes to it. In so doing, the thesis contributes theoretically, methodologically and empirically to research into MT-assisted TM translation and MT-assisted TM translation processes in particular. Theoretically, the thesis contributes to TPR, especially research into translation processes in the workplace. Methodologically, the research design and methods used in this thesis illustrate how workplace studies of translators' interactions with technology can be conducted in ways that acknowledge the context-dependence of translation processes and allow for comparisons. Also, the findings may be applicable in didactic contexts, as understanding professional translators' interactions with technology is relevant for translation trainers and for translation students who may expect translation technology to be an indispensable part of their future professional careers. Finally, exploring translators' interactions with an MT-assisted TM tool and their attitudes to these

¹ TextMinded Danmark A/S is also a member of the TextMinded Group, which is a group of independent European LSPs. The present study exclusively explores TextMinded Danmark A/S. Henceforth, I shall refer to TextMinded Danmark A/S only as "TextMinded".

interactions may help identify technological improvements that are relevant for developers of translation tools (cf. O'Brien 2012, p.116).

1.5 Delimitation

The thesis focuses on MT-assisted TM translation as it unfolds at one Danish LSP only. As will be clarified in Chapter 4, the study deals exclusively with one language direction and with two texts from two genres. Furthermore, several MT-assisted TM tools exist; however, the study only examines how the participating translators use the tool SDL Trados Studio 2011, which at the time of data collection was the translation tool primarily used at TextMinded. Thus, in these respects, the study is limited in scope, and the findings are not generalizable to MT-assisted TM translation in general.

Furthermore, the thesis is concerned with an MT-assisted TM setup where the translators are provided with translation suggestions for all sentences in the source text. Thus, the translation process where translators translate from scratch, i.e. without being provided with translation suggestions, is not studied. Finally, although the thesis explores the amount of editing implemented in the translation suggestions provided to translators which may be taken as an indication of the quality of the provided suggestions, it does not include an evaluation of their quality or the quality of the final translation products.

1.6 Thesis structure

Chapter 2. Introducing Machine Translation-assisted Translation Memory translation

Chapter 2 presents the type of technology which is the focus of this thesis: MT-assisted TM translation. It does so by introducing translation technology and computer-assisted translation (CAT) and describing the history and central aspects of MT, TM and MT-assisted TM translation.

Chapter 3. Theoretical framework

Chapter 3 situates the thesis within the disciplinary context of TS and the subfield of TPR. It argues that MT-assisted TM translation is a context-dependent process of TCI. After describing methods typically applied in TPR, the chapter reviews previous research relevant for this thesis, and addresses emerging research gaps.

Chapter 4. Methodology

The fourth chapter presents the methodology of the thesis. It establishes pragmatism as the worldview guiding the study and argues for the suitability of an embedded mixed methods research design. It also describes the design, a workplace study in which a contextual part and an experimental part are embedded.

Chapter 5. Analyses and results

In chapter 5, the analyses and findings of the thesis are presented. First, Chapter 5 briefly introduces the background for the implementation of MT at TextMinded, describes the typical workflow at TextMinded and outlines individual differences between the translators

who participated in the experimental study. This contextualisation serves to frame the subsequent analyses. The seven research questions are then dealt with in separate subsections, each including an introduction outlining the research question and the data used, a description of the analytical method and its limitations, a presentation of the findings and finally, a synthesis and discussion of the findings.

Chapter 6. Discussion and conclusion

In chapter 6, the findings of the thesis are synthesized and discussed. Furthermore, limitations and contributions of the thesis are described. The thesis concludes with future research perspectives and final remarks.

Chapter 2

Introducing Machine Translation-Assisted Translation Memory Translation

Chapter 2. Introducing Machine Translation-assisted Translation

Memory translation

In this chapter, MT-assisted TM translation, which this thesis has as its central topic, will be introduced. To this end, the chapter starts with a brief introduction to translation technology and CAT, before turning to a short description of the history and central aspects of MT and TM. The chapter ends with a description of MT-assisted TM translation, and outlines central questions arising from the integration of TM and MT.

2.1 Translation technology

Translation technologies comprise different types of tools that aid translators in the translation process. Translation technologies have been classified by, among others, Alcina (2008), who groups them into five categories: 1) the translators' computer equipment, 2) communication and documentation tools, 3) text edition and desktop publishing tools, 4) language tools and resources, and 5) translation tools. The first category includes elements related to the general functioning of the computer such as physical components, antivirus software and printers. The second category comprises tools and resources used by translators to interact with clients and other translators, for example, such as e-mail, chat and virtual networks. Included in the third category are tools used for writing, correcting and editing texts, especially word processors. The fourth category includes tools and resources for the collection and organization of linguistic data such as electronic dictionaries, databases and text corpora. The fifth category comprises tools used in "the actual translation process" (Alcina 2008, p.98). This category involves "assisted translation programs (which include translation memory management software, terminology databases and word processor) and machine translation programs" (Alcina 2008, p.98). This thesis is specifically concerned with the fifth category.

Typically, "assisted translation programs" are referred to as "computer-assisted translation" (CAT) tools. The most popular type of CAT tool is the "translator's workstation" or "translator's workbench", whose main component is a TM (Bowker & Fisher 2010). Apart from the TM, the CAT tool typically contains several other functions, among others a terminology management system which allows for the building and leveraging of termbases (Bowker & Fisher 2010) and different quality assurance (QA) tools. Today, many CAT tools also include MT despite a clear distinction typically being drawn between MT and CAT. This distinction has been based on the notion that CAT aims at *assisting* the translator, whereas MT is expected to automate the translation process and to a wide extent *replace* the translator (Alcina 2008, p.80; Bowker & Fisher 2010, p.60; Kenny 2011, p.457; Somers 2011, p.427; Dunne 2013a, p.1; Dunne 2013b, p.1; Stein 2013, p.VII; Wong 2015, p.239). However, when MT is integrated into CAT tools, the boundary between MT and CAT becomes blurred (O'Brien & Moorkens 2014, p.131). Thus, it is questionable whether a clear-cut distinction between MT and CAT is fruitful. Also, the use of the term "CAT tool" has been criticized. For instance, Zetzsche (2014) has criticized the term when it is used as a synonym for "TM tool",

since the latter is only a subcategory of the former, with “CAT tool” also comprising other functions as mentioned above. Instead, he suggests the term “Translation Environment Tools” (TEntTs) to refer to CAT tools, including all features in the tool. However, as noted by Candel-Mora and Polo (2013, p.76) and Teixeira (2014b, p.10), translators and translation scholars continue to talk about CAT tools, which I will also do in this thesis, to refer to the integrated suite of tools, i.e. both TM, MT and the additional tools included, specifying different subcomponents as necessary.

In 1992, Hutchins and Somers provided an overview of different translation methods in their well-known spectrum (Figure 1). Here, methods of translation are categorized according to the degree of human involvement and degree of mechanization. At one end of the spectrum, we find fully automatic high quality translation (FAHQT), i.e. translation of high quality without any human involvement. This corresponds to the perception of MT as a technology which can replace the human translator, as mentioned above. At the other end of the spectrum, we find traditional human translation involving no mechanical aids, i.e. translation as it has been carried out for centuries. Between these extremes we find machine-aided human translation (MAHT) and human-aided machine translation (HAMT). In MAHT, the translator uses computer-based linguistic aids “as required or desired” (Hutchins & Somers 1992, p.150), for example spell checkers, bilingual dictionaries and encyclopedias – and TM systems. In HAMT, MT systems are used to produce translations with the assistance of humans when needed, for example in the form of pre-editing a source text before using MT, or in the form of post-editing of MT.

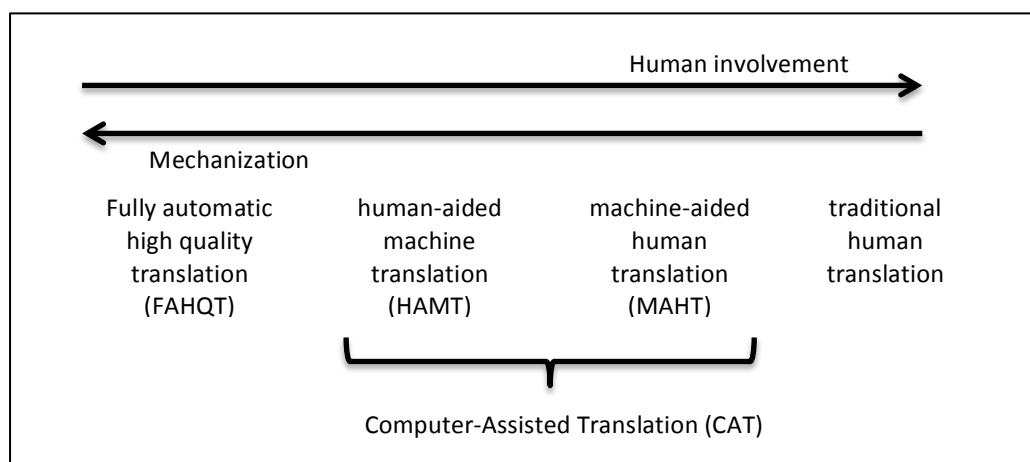


Figure 1. Hutchins and Somers' spectrum of translation methods (based on Hutchins and Somers 1992, p.148)

Hutchins and Somers refer to both HAMT and MAHT as CAT. When MT is combined with TM in a CAT tool, this may be regarded as an intermediate form of CAT translation, occupying the middle ground between HAMT and MAHT. In the following sections, I will describe the basics of MT and TM. Historically speaking, TM was an offshoot of research into MT (Garcia 2015, p.80), and thus, MT will be treated first, although TM was the first of the two to be widely applied by practising translators.

2.2 Machine Translation

MT, also sometimes referred to as *automatic translation*, is “a sub-field of computational linguistics (CL) or natural language processing (NLP) that investigates the use of software to translate text or speech from one natural language to another” (Liu & Zhang 2015, p.105). The goal of MT is to automate the translation process, and the ultimate goal is to produce FAHQT, although up to now, success in achieving this goal has been limited (Kit & Tak-ming 2015, p.213).

The idea that techniques for code-breaking during the Second World War could be used in computer translation is attributed to Warren Weaver (Somers 2011, p.428).² A major stimulus for the beginning of MT research was a memorandum in 1949 by Weaver where he called for research in MT (Melby 1981a, p.24; Hutchins 2005, p.1; Hutchins 2015, p.120). During the following 10 to 15 years, research in MT started in a number of countries (Somers 2011, p.428); however, the quality of the MT output was disappointing (Hutchins 2005, p.2). In 1960, Bar-Hillel criticized that the goal of MT was FAHQT, a term originally coined by Bar-Hillel himself (Melby 1981a, p.25): he argued that FAHQT was not only unrealistic, but also impossible in principle because computers lack the extra-linguistic knowledge necessary to resolve ambiguities (Bar-Hillel 1960, pp.158–163; Melby 1981a, p.25; Hutchins 2010, p.38). In 1964, the Automated Language Processing Advisory Committee (ALPAC) was formed with the purpose of evaluating the progress in MT research, and in 1966 it concluded in the famous ALPAC report that MT was slower, less accurate and twice as expensive as human translation, and that there was “no immediate or predictable prospect of useful machine translation” (ALPAC 1966, p.32). Instead, it suggested machine-aided translation as a means to better, quicker and cheaper translation (Garcia 2012, p.296). Although the report was widely criticized (Hutchins 2010, p.39), its impact was profound, and Melby refers to the ALPAC report as a “funeral announcement for significant funding of machine translation” (1981a, p.25) as it brought a virtual end to MT research in the United States and also had significant impact elsewhere (Hutchins 2005, p.2). However, research still continued in a number of countries including Canada, France and Germany (Hutchins 2005, p.2), and MT research experienced a revival in the United States from the mid-1970s (Hutchins 2010, p.43; Liu & Zhang 2015, p.107).

Until the end of the 1980s, the predominant approach to MT was rule-based (Hutchins 2015, p.128). Rule-based MT (RBMT) “relies on morphological, syntactic, semantic, and contextual knowledge about both the source and target languages respectively and the connections between them to perform the translation task” (Yu & Bai 2015, p.186). This requires manual development of linguistic rules, and is thus costly and time-consuming (Liu & Zhang 2015, p.201). In the early 1990s, interest in exploiting large text corpora for MT grew, and researchers turned to statistical methods (Hutchins 2010, p.29). Statistical MT (SMT) “is based on the idea that a computer program can “learn” how to translate by analyzing huge amounts of data from previous translations and then assessing statistical probabilities to decide how to translate a new input” (Somers 2011, p.434). The statistical approach is now

² Here, a few key points in the history of MT are provided. For more comprehensive accounts of the history of MT and post-editing, see e.g. (Somers 2011; Hutchins 2010; Hutchins 2015; Garcia 2012).

the predominant paradigm within MT, but many researchers also adopt “hybrid” approaches that combine SMT and RBMT (Hutchins 2010, p.54). SMT is said to generate the best translations when the MT system is “trained” with data from a specific domain and used for translating texts from that same domain (Somers 2011, p.436; Stein 2013, p.XI; Cettolo et al. 2014, p.2). Data used for training of MT systems include TMs and client-specific terminology in a termbase. In addition, the source text may be pre-edited or written in a so-called controlled language where vocabulary and syntax are restricted in order to improve the quality of the MT output. The most recent development in MT research is Neural MT (NMT), a new approach to MT that is based on large so-called artificial neural networks. NMT is said to be a promising approach to MT, but is still in the early stages of development (Thang et al. 2016).

Two applications of MT are usually distinguished: 1) when users only want to get a basic idea of the content of a text, and 2) as a step in the production of a text of publishable quality. The former is referred to as MT for assimilation or “gisting”, and the latter as MT for dissemination (Forcada 2010, pp.217–218; Hutchins 2010, p.30; Garcia 2012, p.305; Hutchins 2015, pp.126–127). Depending on how the translation is used, MT output might be used as it is, or “light” or “full” post-editing of the output may be performed. According to Allen, the task of post-editing is to “edit, modify and/or correct pre-translated text that has been processed by an MT system from a source language into (a) target language(s)” (2003, p.297). Post-editing has usually been viewed as a task that is different from revision of TM matches and review of other translators’ translations, mainly because raw MT output typically contains other types of errors than those found in translations made by humans (Hutchins 2015, p.126; Mesa-Lao 2015, pp.5–7; O’Brien 2016). Typically, the MT engine provides a static suggestion for the translation of a source segment which can then be post-edited, but recent developments include interactive functions where the MT engine updates the translation suggestion on the fly in response to the post-editor’s entered edits (cf. e.g. the *Interactive Translation Prediction* function developed by the CasMaCat project (Sanchis-Trilles et al. 2014) and *Lilt* as described by Zetzsche (2016)).

The point of using MT is to speed up the translation process and thus reduce translation cost. This, however, requires that the raw MT output is of good enough quality for post-editing to be more profitable than translation from scratch. Krings (2001, p.178) established post-editing effort as the key determinant of whether the application of MT is worthwhile. He distinguished three types of post-editing effort, namely temporal, cognitive and technical effort. Temporal effort refers to the time spent on editing MT output, cognitive effort refers to the mental processing involved in editing the output, and technical effort refers to the physical actions needed to edit the output. Since cognitive effort cannot be observed directly, temporal and technical effort are used as indicators of cognitive effort. According to Krings (2001, pp.178–179), temporal effort is the most important measure of the economic viability of MT and the effort most easily measured. Technical effort has been approached by measuring the number of keystrokes and cut-and-paste operations involved in post-editing as well as by measuring the so-called *edit distance* between the raw MT output and the post-edited version (Koponen 2012, p.182), reflecting the amount of editing needed to change the MT output into the final translation. The edit distance is often measured by

means of automatic evaluation metrics such as BLEU, METEOR and HTER and is also taken to be an indicator of the quality of the MT output (Kit & Tak-ming 2015, p.225). In terms of quality, another area of interest in MT research is “confidence estimation”, i.e. the production of so-called “confidence scores” that provide translators with an indication of the quality of the provided MT suggestion (Specia et al. 2009). However, this has not yet been widely implemented in commercial tools (O’Brien & Teixeira 2016a).

2.3 Translation Memory

After it was realized that automation of the translation process by means of MT was a bigger challenge than expected, attention turned to developing tools that could aid translators (Bowker & Fisher 2010, p.60; Folaron 2010, p.342; Dunne 2013a, p.1; Garcia 2015, p.70). Although CAT tools did not become commercially available until the 1990s, the basic idea behind them goes back to the 1960s and 1970s when the first proposals for the various components that would come to be part of the translator’s workstation were put forward (Hutchins 1998; Kenny 2011, p.465). Hutchins (1998) attributes the idea of using a translation archive as what is now known as a TM to Arthern (1979). Arthern argued that a system should be devised in which source texts and their translations were stored, and which could compare a new source text to this archive and retrieve similar text units. Arthern referred to this as “translation by text-retrieval”. Another important step in the development of TM was Kay’s (1980) report in which he proposed a translator’s workstation (or *amanuensis*, as he called it) which would help the translator (and not replace the translator as many of Kay’s contemporaries still believed that MT could), for example in finding previously translated passages. According to Hutchins (1998, p.297), Melby’s (1981a; 1981b; 1982; 1984) suggestion that a bilingual concordance would be a valuable tool for translators and his proposals for a translator’s workstation were also important to the development of TM. In the early 1990s, four commercial TM systems appeared on the market (TranslationManager/2 from IBM, the Transit system from STAR AG, the Eurolang Optimizer and the Translator’s Workbench from Trados) (Hutchins 1998, p.303; Christensen & Schjoldager 2010, p.90).

A TM is a database of paired source and target texts divided into segments, typically sentences. The primary purpose of using TMs is to recycle past translations; as such, the TM can be said to constitute a supplementary memory for the translator (Christensen 2011, p.140; Dunne 2013b, pp.2–3). A source-text segment stored together with its translation is called a “translation unit”. Choosing the sentence as the primary translation unit has been discussed and criticized, since segmentation into sentences may not correspond to the cognitive translation unit, i.e. cognitive segmentation on the part of the translator. Dragsted (2006) has highlighted this discrepancy which, according to Melby and Wright, may lead to a “cognitive disconnect between the human translator and the TM” (2015, p.663). Nonetheless, the sentence continues to be the typical translation unit in CAT tools.

A TM can be built interactively by a translator who populates the TM with translation units as he or she translates, or it can be created by aligning source and target segments in previously translated texts (Kenny 2011, p.65ff.). When working with a TM, a new source

text is automatically divided into segments; each segment is compared to the TM, and so-called *matches* between the new source text and the contents in the TM are retrieved. This can occur either before or during the translation process, referred to as pretranslation and interactive translation, respectively (Kenny 2011, p.470; Garcia 2015, p.71). Three types of matches are normally distinguished: *exact* or *100% matches* (referred to in this thesis as 100% matches), *fuzzy matches* and *no matches*. If a new source segment is identical to a source segment stored in the TM, a *100% match* will be retrieved into the target segment; if the source segment is not identical, but similar to a segment in the TM, a *fuzzy match* is retrieved; and if the TM contains no similar segment, we talk about a *no match*, in which case the target segment will be left empty in a traditional TM system. The translator will then have to translate the source segment from scratch. The degree of similarity between a fuzzy match and a new source segment can, in principle, range from 1 to 99%; however, the threshold is often set at 70%, meaning that fuzzy matches are provided for segments with match values between 70% and 99%, and segments with match values below 70% are treated as *no matches* and left empty.

Some tools also offer *context matches*. A context match (CM) is a 100% match where the two source text segments are also preceded by exactly the same segment, i.e. occur in the same context. In that sense, a context match is better than a 100% match. If translators want to pretranslate matches, they can choose to pretranslate only those segments where 100% and context matches are found in the TM or also those where fuzzy matches are found (Candel-Mora & Polo 2013, p.79). When presented with a match, the translator can choose to accept it, revise it or reject it and then translate the source segment from scratch (Bowker & Fisher 2010, p.61; Kenny 2011, p.467; Garcia 2015, p.81). Typically, a translated segment will become immediately available for reuse in case an identical or similar segment occurs later in the same source text (Melby & Wright 2015, p.663).

When a match is retrieved, it is typically displayed together with a set of metadata, such as its provenance (i.e. whether it comes from a TM or, in the case of MT-assisted TM, from an MT engine), its TM match value, and textual differences between the new source segment and the source segment retrieved from the TM (cf. e.g. Teixeira 2014b). Also, some texts contain so-called *tags*, which contain information on formatting and structure in the document, for example, on whether a word is to be formatted in bold or italics. *Placeables* and *variables*, i.e. numbers, times, dates, names etc., and terminology suggestions from termbases are also typically highlighted (the latter is referred to by Bowker (2002, p.101) as *active terminology recognition*). Warburton (2015, pp.655–656) characterizes active terminology recognition as a “push approach”, since terminology is “pushed” to the translator at the moment it is needed, if the sentence to be translated contains a term which is in the termbase. In addition to the aforementioned functions, TM systems typically offer a concordancing function, which allows the translator to search the TM for specific words or strings of words (Melby & Wright 2015, p.668). This, on the other hand, reflects a “pull approach”, “where the user decides if and when to access the information” (Warburton 2015, p.656). According to Valli (2014, p.59), concordance searches can be carried out as so-called *spot searches* (one-time search events) or as one or more *search sessions* (a repeated search for the same or changed text strings). In the case of a search session, the initial

search may be changed in different ways in subsequent searches. For example, the initial search may be reduced through a left or a right trim (where the left- and right-most part are removed, respectively) (Valli 2014, p.61). Also, some tools include “the relatively new feature of automatically predicting the text that is being typed and giving a drop-down list of potential alternatives” (O’Brien 2012, p.116), referred to as an “as-you-type” automatic translation suggestion by Dunne (2013b, p.4). For example, in the CAT tool SDL Trados Studio, this feature is called *AutoSuggest*. Finally, TM tools often offer features or shortcuts for other functions such as easily copying the source text into the target segment (called *Copy Source to Target* in SDL Trados Studio) and for automatically skipping confirmed/translated segments and moving to the next unconfirmed/untranslated segment (Dunne 2013b, p.4).

Thus, by means of a TM, translators quickly retrieve previously translated text and, for example, translate a revised or updated source text more efficiently than without a TM system (Melby & Wright 2015, p.664). More than one translator can also use the same TM and collaborate on a translation task. Whether the TM is used by an individual translator or by pairs or teams of translators, the advantages of using a TM include increased productivity, increased terminological consistency and reduction of repetitive work (O’Brien 2012, pp.106–107). A number of disadvantages have, however, also been highlighted. For example, TMs may contribute to error propagation, since translations that contain errors are recycled in the TM. In that sense, TMs work on a “garbage in, garbage out” principle (Risku 2007, p.92; Melby & Wright 2015, p.665). The sentence-by-sentence approach has also been problematized, not only because this segmentation may not correspond to the translator’s cognitive segmentation of the text, as mentioned above, but also because translators might lose track of the text as a whole because they are forced to work with isolated sentences. This may have a detrimental effect on the quality of the target text because the linearity of the text, its cohesion, is disrupted (Pym 2011b, p.3; O’Brien 2012, p.114; Candel-Mora & Polo 2013, p.81; LeBlanc 2013, p.7). As expressed by Garcia, translators are “locked into the segment, removed from a holistic view of the text” (2008, p.58). In this respect, Melby et al. (2015, p.413) state that the segment-by-segment approach is based on the notion of monotonicity, where segments of source and target texts are assumed to progress in parallel with no need for changes in the target text. They warn that this might impose a monotonic mindset on translators, and they question whether the segment-by-segment approach has “reduced the richness of translation by imposing the sequence of source-language segments on the target language” (Melby et al. 2015, p.417). Translators might not only feel that they should stay close to the structure of the source text (Bowker & Fisher 2010, p.63; LeBlanc 2013, p.2), they might also be inclined to adapt their style to get more matches (Candel-Mora & Polo 2013, p.81), for example by avoiding the use of anaphoric and cataphoric references and opting for lexical repetitions that can yield a higher proportion of 100% matches (O’Hagan 2009, p.50), a phenomenon referred to as “peep-hole translation” (Heyn 1998, p.135).

Not only is the translation process potentially restrained by a CAT tool in several ways, but it is also argued that recycling segments which may have been retrieved from texts that have been translated by different translators may make the target text read like a “stylistic

hodgepodge”, a “stylistic patchwork” or a “sentence salad” (Bédard 2000, p.45; Bowker 2005, p.16; Lagoudaki 2008, p.266; Kenny 2011, p.471). Also, employers might require translators to use matches exactly as they are retrieved from the TM and thus translators might not be free to improve the text as they see fit, a phenomenon referred to by LeBlanc as “enforced recycling” (2017). This could impact negatively on translators’ professional autonomy and satisfaction (LeBlanc 2017).

2.4 Machine Translation-assisted Translation Memory translation

In traditional TM systems, *no matches* have to be translated from scratch, but as the quality of MT output improved, TM systems started to incorporate MT as an additional translation aid. This integration of TM and MT means that translators and translation companies can pretranslate a source text with 100% and fuzzy matches and then machine translate the *no matches*, resulting in a “hybrid” pretranslated text (Garcia 2009, pp.206–207; Guerbero Arenas 2009, p.11; Tatsumi 2010, pp.26–27; Pym 2011a, p.1; Flanagan & Christensen 2014, p.257; Teixeira 2014b, p.16; Ehrensberger-Dow & O’Brien 2015, p.112). In this environment, translators are provided with suggestions for the translation of every sentence in the source text. This type of translation is what I refer to as “MT-assisted TM translation”.

The convergence of TM and MT gives rise to a number of questions. For instance, relating to the blurring boundary between MT and CAT as mentioned earlier in this chapter, since translators in an MT-assisted TM environment alternate between editing TM matches and post-editing MT output (O’Brien & Moorkens 2014, p.132), does it make sense to distinguish between these two tasks? Indeed, the blurring of the boundary between MT and TM seems to be reinforced when translators edit MT output which is then included in the TM and retrieved as TM matches in new translations and when TM data are used to train MT engines. Thus, as indicated by O’Brien, it seems more appropriate to treat MT-assisted TM translation as “an integrated CAT task” (2016b). Along the same lines, Teixeira (2014b, pp.184–185) suggests that we either broaden the definition of post-editing to include editing of TM matches as well, or we drop talking about post-editing and talk about “translation” instead, since today virtually no translation happens without technology.³ I agree that, with the integration of TM and MT, it does not appear fruitful to refer to working with TM and MT matches as two different activities.⁴ Therefore, throughout the thesis, as also indicated in the introduction, I shall refer to the part of the MT-assisted TM translation process where the translators evaluate the provided TM and MT matches and, if they deem it necessary, modify them, as *editing*. I regard *editing* as a fitting label for this part of the

³ Silva’s definition of *post-editing* is an example of the first of Teixeira’s suggestions. Silva defines post-editing as “the act of correcting a translation proposal” (2014, p.26). He specifies that correcting output from an MT engine may be referred to as “post-editing MT”, whereas correcting TM matches may be referred to as “human post-editing”.

⁴ Interestingly, in the ISO 17100:2015 standard for translation services, it is specified that the term *post-edit* “does not refer to a situation where a translator sees and uses a suggestion from a machine translation engine within a CAT (computer-aided tool)”, but rather to a situation where a “post-editor will edit output automatically generated by a machine translation engine” (The International Organization for Standardization 2015, p.2). Thus, there is a clear distinction between these two activities, but a specific term is not provided for editing MT matches within a CAT tool.

MT-assisted TM translation process since the translators are provided with translation suggestions for every sentence in the source text and are thus encouraged to edit these rather than translate from scratch. If we relate this to Jakobsen's (2002) tripartite model of the translation process (mentioned in the introduction and further explained in Section 3.2.1), we may say that the nature of his *drafting phase* has changed to being a process of editing matches. In Hutchins and Somers' (1992) spectrum shown in Figure 1 above, drafting would seem to gradually turn into editing as we move to the left, i.e. from human translation to HAMT, i.e. as the degree of human involvement decreases and the degree of mechanization increases. Finally, I note that I refer to suggestions coming from both a TM and an MT engine as "matches", although "match" is technically not entirely accurate when discussing MT suggestions, since, contrary to TM, comparison which might produce a "match" is not involved.

The combination of TM and MT raises other questions as well. How do translators actually interact with the MT-assisted TM tool to produce translations? For example, what is the difference between editing TM matches and editing MT matches, in terms of both the time translators spend on the respective matches and the amount of editing they perform? Following on from that, what is the appropriate threshold between the use of TM and MT matches, i.e. below which TM threshold should MT be applied? This has been a point of particular interest in previous research (Bruckner & Plitt 2001; Tatsumi 2010; Guerberof Arenas 2012), and is a point that is also highly relevant to the translation industry. Furthermore, we might ask whether interaction between the translator and the TM and MT matches, respectively, differs, for example, in terms of the use of tools and resources other than the matches themselves (e.g. concordance searches, Web searches and the like)? Also, does the integration of TM and MT have implications for the checking phase, i.e. the translators' final examination of whether the target text is adequate, and for the review part of the translation process? In addition, Schmitt (2015) and O'Brien (2012), for example, have pointed out that translators have conflicting perceptions of MT and their future as translators, with Schmitt stating that "[e]ither it is assumed that the MT can never be as good as a human translation or machine translation is viewed as the ultimate enemy of the translator and as a job killer" (2015, p.234; cf. also O'Brien 2012, p.119). So, another relevant question concerns what translators think about the integration of MT into TM systems. These questions will be addressed in this thesis.

Chapter 3

Theoretical chapter

Chapter 3. Theoretical framework

This chapter has four main purposes. First, it aims to contextualize the object of the thesis theoretically, i.e. place the thesis within the field of TS and the subfield of TPR. Second, following from the almost omnipresent role of technology in translation practice today and the increased focus on translators' interaction with tools in TPR, after introducing the field of HCI, I argue that CAT is a form of TCI. Third, I describe the methods typically applied in TPR, and fourth, I provide an overview of relevant research and address emerging research gaps.

3.1 Translation Studies

As an academic discipline, TS is quite young (Munday 2016, p.13), only gaining recognition as a discipline in its own right in the mid 1980s (Snell-Hornby et al. 1994). TS is often referred to as an interdiscipline because of "the large number of subjects with which it overlaps" (Snell-Hornby et al. 1994). This label seems fitting, since the phenomenon of translation is in itself inseparably connected to disciplines like communication, linguistics and culture (Hansen 2005a). Furthermore, TS was established by researchers from many different fields - "disciplinary immigrants" in the words of Gile (2008) - such as linguistics, literary studies, sociology and cognitive science. Thus, from the very beginning of its existence, the field was a gathering place for researchers with an interest in translation, but with different backgrounds. What is more, theories and research methods continue to be borrowed from other disciplines (Hansen 2005a; Jensen 2013, p.35; Brems et al. 2014, p.3).

Holmes' seminal paper entitled "The Name and Nature of Translation Studies" (Holmes 1988; reprinted in Holmes 2000) is generally considered the founding statement of TS (Snell-Hornby 2006, p.3; Munday 2016, p.16). Holmes first presented his thoughts in a paper at a congress in Copenhagen in 1972 in which he envisioned a distinct discipline called "Translation Studies" and described the scope and structure of the discipline in his famous "map", illustrated by Chesterman in Figure 2.

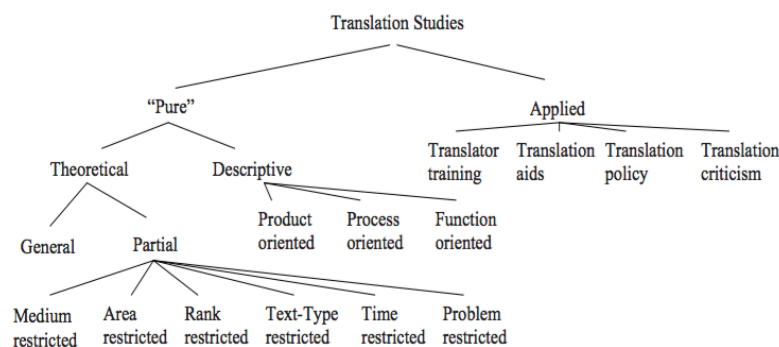


Figure 2. Holmes' map (borrowed from Chesterman 2009, p.14)

According to Holmes, TS incorporates pure and applied research. Pure research is further divided into theoretical and descriptive research. According to Holmes, the theoretical branch is further subdivided into general and partial theories. A general theory should accommodate "so many elements that it can serve to explain and predict all phenomena falling with the terrain of translating and translation" (Holmes 1988, p.186). According to Snell-Hornby (2006, p.43), Vermeer's skopos theory of translation (Vermeer 1978; Reiss & Vermeer 1984) falls within this category. Partial theories deal with one or a few aspects of translation theory and are grouped into six subcategories: medium-, area-, rank-, text-type-, time- and problem-restricted. According to Holmes, descriptive TS should describe the phenomena of translating and translation "as they manifest themselves in the world of our experience" (1988, p.184). Within descriptive TS, Holmes distinguishes between product-oriented, process-oriented and function-oriented research. The first is concerned with describing translations, for instance, in the form of corpora. Process-oriented studies are concerned with "the process or act of translation itself" and with what "takes place in the "little black box" of the translator's "mind"" (Holmes 1988, p.185). Holmes advocates an empirical approach to studying these processes. Function-oriented research is concerned with describing the function of translations in target contexts. Finally, the applied branch of Holmes' map includes applications of TS "that extend beyond the limits of the discipline itself" (Holmes 1988, p.189), divided by Holmes into translator training, translation aids, translation policy and translation criticism. Although Holmes' map has been discussed and developed over the years (cf. e.g. Vandepitte 2008; Chesterman 2009; Munday 2016), it shows in a visual form that translation may be approached from different perspectives and that translation research may contribute to different branches of the field; indeed, it has been recognised as "a visionary blueprint of the future discipline" (Snell-Hornby 2006, p.41).

The development of TS over the years is often described as a history of "turns" (Snell-Hornby 2006; Cronin 2010, p.1; Brems et al. 2014, p.2; Gambier 2014, p.8). For example, the pragmatic turn of the 1970s and the cultural turn of the 1980s have been identified as being the most decisive for the development of TS. According to Snell-Hornby (2006), TS witnessed an empirical turn and a globalization turn in the 1990s, when more empirical investigations of translation were called for and when globalization caused radical changes in the work of the translator. Although Snell-Hornby also pointed to developments in technology as part of the globalization turn, Cronin (2010) and O'Hagan (2013) have specifically emphasized that we are now witnessing a technological turn in TS due to the increasing impact of translation technology on translation practice. It is worth noting that several scholars have pointed to a striking lack of impact of technology on TS (Munday 2009, p.15; O'Hagan 2013; Doherty 2016, p.952).

This thesis is concerned with translation processes as they unfold when translators interact with an MT-assisted TM tool. As such, it is situated within the disciplinary context of TS and more specifically, within the field of TPR, which according to Jakobsen (2014) might be seen as process-oriented descriptive TS in Holmes' framework. According to Jakobsen, due to the increased use of translation technology, descriptive TS and thus TPR should "seek to describe the nature and quality of this new interaction between the human agent and the machine" (2014, p.83). It is in this area that this thesis makes its contribution.

3.2 Translation Process Research

The first systematic empirical studies of translation processes occurred in the 1980s (Krings 1986; Gerloff 1988; Lörscher 1991). In fact, process research is considered to be one of the drivers behind the empirical turn in TS (Snell-Hornby 2006, p.123ff.; Ferreira et al. 2015, p.5). Since then, much research has and is still being conducted on translation processes as is evidenced by the large number of edited volumes and special issues of journals concerned with TPR (for an overview of edited volumes on TPR and TPR papers in journals in the years 2006-2013, see Muñoz Martín 2014, pp.52–53). According to Munday, process research is one of the “most exciting and rapidly developing areas in translation studies” (2016, p.104). Just as TS is said to be interdisciplinary, so too is TPR, borrowing approaches and methods from fields such as psychology, cognitive science and anthropology (cf. e.g. O’Brien, 2013).

TPR is defined by Jakobsen as a “special descriptive, empirical, experimental approach to translation studies based on close, technology-supported observation of translational (micro)behaviour” (2014, p.65). As will be addressed below, TPR in recent years has undergone a development which has extended the scope of TPR to encompass more than the technology-supported observation of translational (micro)behaviour mentioned by Jakobsen. However, his definition appears to capture what is generally viewed as the mainstream understanding of TPR (Risku 2014b, p.331). Jakobsen outlines three basic assumptions underlying TPR. The first assumption is the “mind-brain-behaviour correlation assumption”, according to which non-observable cognitive, mental activity has observable behavioural correlates, i.e. what happens in the “black box” has behavioural manifestations, for example, in the form of speech and writing. Since cognitive activity may only be inferred, Jakobsen states that Holmes’ “little black box” remains a classic “known unknown” (2014, p.66) in TPR. The second assumption is the “problem-processing effort-duration correlation assumption”, according to which pauses between these behavioural manifestations are also important cues to cognition. Finally, it is assumed in TPR that triangulation of quantitative and qualitative data from a translation process is required, referred to as the “multimethod-stronger-hypothesis assumption” (Jakobsen 2014, pp.75–76). I shall return to the first assumption later in this chapter and to the third assumption in Chapter 4 in which the methodology of the thesis is explained. Pause analysis has been a common approach to studying the translation process (cf. e.g. Dragsted 2004; Jakobsen 2005; Dragsted 2006; O’Brien 2006); however, this thesis is not concerned with pauses in the translation process and for this reason I shall not comment further on Jakobsen’s second assumption.

3.2.1 Definitions of the translation process

The translation process has been viewed from different angles and defined in different ways over the years. Sometimes, the translation process is defined as encompassing a specific translator’s work with a specific text as done by Hansen who defines a translation process as “everything happening, from the moment the translator starts working on the brief and the source text until he finishes the target text” (2013b, p.88). Thus, the translation process is as long as the length of time the translation task was worked on by the translator. A similar view of the translation process is reflected in Jakobsen’s (2002, pp.192–193) well-known

tripartite model of the translation process where he divides the translation process into three phases: an *orientation*, a *drafting* and an *end revision* phase. According to Jakobsen, the orientation phase is “the time delay between the appearance of the source text on the screen and the typing of the first text production key” (2002, p.192). It can be argued that Jakobsen’s and Hansen’s definitions differ in terms of the starting point of the process since the translator may start working on the brief before the source text appears on the screen, so, in studies investigating the orientation phase, this should be addressed. According to Jakobsen, the drafting phase “runs from the first text production keystroke until the first typing of the final punctuation mark (or equivalent keystroke)” (2002, pp.192–193). In the drafting phase, all kinds of activities can occur; for example, text is typed, deleted, copied and pasted and resources are consulted. Thus, drafting involves not only the production of text, but may also entail a great deal of revision, which Jakobsen terms “online revision” (2002, p.193) since it covers revision undertaken before the first draft of the target text is completed. In the end revision phase, the translator checks the text produced in the drafting phase and implements necessary changes. This phase lasts until the translator decides that the translation is finished (Jakobsen 2002, p.193). Thus, the end point of the translation process is similar in both Hansen’s and Jakobsen’s definitions.

Others have defined the scope of the translation process in a broader manner. For example, Risku states that:

“[t]he [translation] process is defined as starting with the decision to have something translated and ending when the translation is approved and paid, last contacts in the project are completed and the translation is made available in the target setting” (Risku 2014b, p.349).

In this sense, the translation process not only encompasses the specific translator’s work with a specific text, but also what precedes and follows this part of the process. This is also reflected in Toury’s (2012, pp.67–69) distinction between the translation *act* and the translation *event*, where the translation act refers to the cognitive translation process, i.e. “the unique encounter of a human agent with a single text” (2012, p.67), and the translation event refers to the “situation in and for which the act is performed” (2012, p.67), i.e. the act’s “embeddedness in a particular context” (2012, p.67). Chesterman elaborates on Toury’s distinction and tentatively suggests that a translation event begins “when the translator accepts the job (or perhaps when the client begins to look for a translator?), and ends with, say, payment of the bill (or perhaps when the first recipient reads the translation?)” (2013, p.156), and that “a translation act begins when the translator begins to read the source text, and ends when the translator decides to take no further action in revising the translation” (2013, p.156). Thus, although they differ slightly in terms of the starting point of the process, Chesterman’s definition of the translation *act* seems to be consistent with the definitions of Hansen and Jakobsen, and his definition of the translation *event* is similar to Risku’s definition if we consider his broader understanding of the process (from when the client begins to look for a translator until the first recipient reads the translation).

Along the same lines as Risku, Toury and Chesterman, Göpferich (2008) distinguishes between *mental* and *workflow* translation processes, with the latter entailing processes related to the context in which the translator is working and in which mental processes are embedded. Schubert makes a similar distinction between *internal* and *external* processes. Internal processes comprise the “mental activity involved in carrying out the translation work with all its steps and decisions” (2009, p.19): these are not open to direct observation. By contrast, external processes are “everything in the translation process which can be observed by another person” (Schubert 2009, p.19), i.e. the translation workflow and context in which the translation process takes place. Finally, Muñoz Martín (2010b) argues that we may understand the notion of the translation process at three levels. At the first level, it refers to non-observable mental states and operations at play during translation. At the second level, it encompasses observable operations and behaviour which partly reflect processes at the first level. The relationship between the first and second levels appears to build on the same basic idea as Jakobsen’s “mind-brain-behaviour correlation assumption” mentioned above; namely that non-observable mental states (Muñoz Martín’s first level) are partly reflected in observable behaviour (Muñoz Martín’s second level), behaviour which we may study in TPR. At Muñoz Martín’s third level, the translation process is understood as “the period commencing from the moment the client contacts the translator and ending when the translation reaches the addressee, or when the translator is paid” (2010b, p.179), which corresponds with Risku’s definition of the translation process and Chesterman’s definition of the translation event. Thus, Muñoz Martín’s three-level understanding of the translation process captures several of the conceptualizations of the translation process mentioned above.

In the history of TPR, the primary focus has been on internal processes such as problem-solving, decision-making and translators’ consultation of resources (Englund Dimitrova 2010, pp.408–409; Jääskeläinen 2011, pp.128–129; Chesterman 2013, p.155; Dam-Jensen & Heine 2013, p.96; Risku, Windhager, et al. 2013, p.167; Ehrensberger-Dow & Englund Dimitrova 2014). These processes, involving CAT tools or not, have almost exclusively been investigated in experimental settings, i.e. in laboratory settings isolated from translators’ typical working contexts (Jakobsen 2014, p.76). However, there has been a growing concern with achieving ecological validity, i.e. to conduct studies which reflect real-life translation situations (Göpferich 2008, p.5; Saldanha & O’Brien 2013, p.33).

3.2.2 The context-dependent translation process

In recent years, along with the broader definitions of the translation process mentioned above, the scope of TPR has been extended to include contextual aspects. It is increasingly recognized that the translator’s work with the translation task is embedded in a specific context that influences the translator’s mental activity. Thus, in Schubert’s (2009) terms, internal and external processes are interrelated. The implication of the interdependence of internal and external processes is that we cannot ignore the context if we want to understand what is going on in the translator’s mind while translating.

Alongside the increasing recognition in TPR of the influence of external processes on internal processes, scholars are increasingly drawing on cognitive science. For example, several scholars are inspired by the approaches of situated, embodied, extended and distributed cognition (Dragsted 2006; Risku 2007; Göpferich 2008; Muñoz Martín 2010a; Muñoz Martín 2010b; Risku 2010; Christensen 2011; Risku & Windhager 2013; Risku, Windhager, et al. 2013), approaches which are “loosely united yet broadly compatible views on cognition” (Risku, Windhager, et al. 2013, p.157) and all of which highlight the context-dependence of internal processes. This development has also given rise to new labels such as *cognitive translation studies* (Risku, Windhager, et al. 2013; Risku 2014a; Risku 2014b) and *cognitive translatology* (Muñoz Martín 2010a; Muñoz Martín 2010b; O’Brien 2013) to refer to studies that take the situatedness of translation processes into account. The more recent approaches of situated, embodied, extended and distributed cognition are in opposition to previous approaches in cognitive science (such as the information-processing paradigm) which have viewed the mind as an information processor or as a computer whose relations to the external context were of little importance, and based on which translation was viewed as “the rule based transformation of symbols in one given code into another” (Risku, Windhager, et al. 2013, p.155). The implication of more recent approaches which acknowledge the contextual embeddedness of internal processes is that “the central concern is not the brain itself, but the fact that the brain allows us to interact with the environment, artefacts and other human beings” (Risku 2010, p.98), and thus, “cognition is the result of the constant interaction between people and their social and material environments” (Risku & Windhager 2013, p.33), including artefacts such as CAT tools. Cognition is thus viewed as being distributed between people and artefacts, a point that is underlined specifically in the distributed cognition approach (Hutchins 2001). Human beings employ artefacts as scaffolds, i.e. as support for cognition, and thus offload cognitive work onto the environment in order to reduce cognitive workload (Wilson 2002; Risku, Windhager, et al. 2013, p.157). In this way, artefacts are used to amplify and support cognition. In the context of translation, artefacts and technologies such as CAT tools must thus be recognized as important elements in cognition (Krüger 2016), and the storing of previous translations in a TM, for example, appears to be a fitting example of offloading cognitive work to an artefact and taking “the strain off our memories” (Risku 2007, p.90; cf. also Pym 2013, p.1). The view of the translation process as a context-dependent activity led Risku to state that:

“[d]ue to the major role played by the environment, any attempts to explain translation by describing processes in the mind of an individual alone are bound to fail. The mind is only one part of the story. We need to find out not only what happens in a translator’s mind, but also what happens elsewhere, e.g. in their hands, in their computers, on their desks, in their languages or in their dialogues” (Risku 2010, p.103).

Given increasing recognition that translation is a context-dependent, situated activity, it was clear that one needed to abandon the laboratory-setting when studying translation processes (Risku 2014b, p.335). As stated by Ehrensberger-Dow, “[u]nderstanding the situated activity of translation obviously requires investigating professional translation *in*

situ" (2014, p.358), i.e. at translators' workplaces in order to ensure ecological validity (2014, p.366). To account for the situated nature of translation processes, scholars inspired by these approaches have therefore turned to workplace studies. Thus, in addition to the more experimental approach referred to by Jakobsen mentioned above, TPR is in need of "other methodological paths of inquiry to model the cognitive processes in translation and to establish a deeper understanding of how translations are produced" (Risku 2014b, p.335). This has led some scholars to conduct qualitative ethnographic studies in translator workplaces (e.g. Risku, 2014b), while others have combined or promoted a combination of methods traditionally used in laboratory TPR research and more qualitative, ethnographically-inspired methods in the workplace setting (Hubscher-Davidson 2011; Olohan 2011; Risku, Windhager, et al. 2013; Ehrensberger-Dow & Massey 2015). Such studies may focus on observing authentic translation assignments or, as Christensen suggests, be conducted as "experimental field-studies which adopt a combined approach to internal and external processes" (2011, p.156). This thesis is inspired by approaches that view translation as a context-dependent activity, and thus explores its research object of MT-assisted TM translation in a workplace setting. It does so by means of an experimental study which is embedded within a contextual study. The methodology is addressed more fully in Chapter 4.

3.2.3 Translation as Human-Computer Interaction

Alongside increased focus on the contextual embeddedness of the translation process, including the impact of artefacts on cognition, process researchers have started to explore CAT as a form of HCI. Following from the almost omnipresent role of translation technology in translation practice, the influence of CAT tools on translators' mental processes has attracted particular interest (see, for example, a review of such studies in Christensen 2011) and, strictly speaking, investigating translation processes without the application of CAT tools now seems hardly relevant with respect to the actual practices of most professional translators. As stated by Jakobsen, nowadays most translations "do not emerge out of a single human translator's intelligence, but out of a human translator interacting with an "intelligent" translation program" (2014, p.83). This is echoed in the relatively recent viewpoint that translation is a form of HCI. To my knowledge, O'Brien (2012) was the first scholar to explicitly characterize translation as a form of HCI and thus claim a specific affiliation of TS to the field of HCI. However, a whole range of scholars have referred in different ways to translation as interaction between a translator and a machine (cf. e.g. Melby 1987; Dragsted 2004; Dragsted 2006; O'Brien 2007; Olohan 2011; Green et al. 2013; Risku, Windhager, et al. 2013; Ehrensberger-Dow 2014; Carl et al. 2016; Bundgaard et al. 2016). Also, some scholars have applied the method of Contextual Inquiry⁵ (Beyer & Holtzblatt 1998), originating from HCI, to study real work practices of translators using technology (Désilets et al. 2008; Désilets et al. 2009; Karamanis et al. 2010; Karamanis et al. 2011). In this section, I shall introduce the field of HCI and then, in the next section, relate it to TPR and the study of CAT in the form of MT-assisted TM translation.

⁵ As explained by Karamanis et al., a "Contextual Inquiry is a one-to-one field interview conducted where the work is done. The researcher observes the worker as she performs her everyday tasks and inquires about her actions in order to understand her motivations and strategies" (2010, p.247).

HCI emerged as an area of research in the early 1980s in computer science out of the wish to better understand and empower users of computers (Carroll 2013). “Human-Computer Interaction (HCI) is the study of the interaction between people, computers and tasks” (Johnson 1992, p.1), i.e. it is about understanding the tasks people solve using computers, how people interact with these computers and about designing and redesigning technologies with the goal of improving the usability of computer systems (Carroll 1997, p.61). Two key elements in HCI are *artefacts* and *tasks*. Artefacts are artificial devices that enhance human thought (Norman 1991); in the context of HCI, this means software and hardware. According to Norman, artefacts play a critical role in almost all human activity and increase users’ cognitive capabilities. Norman argues for a distributed cognition perspective in HCI and speaks of “cognitive” artefacts, arguing that, due to their importance, artefacts should be integrated into theories of human cognition. Norman further states that the role played by artefacts should be viewed from two different perspectives: a *system* and a *personal* view. From a system view, i.e. from the perspective of an outside observer, we see a person using an artefact to perform a task, and from this perspective, the artefact enhances cognition because as a combined system, the person and the artefact can accomplish more than without the artefact. However, from a personal view, the individual person using the artefact faces a changed task, namely learning to apply the artefact to solve the task, but the person’s cognitive abilities are unchanged.

Johnson (1992, p.6) outlines two types of tasks relevant to HCI, namely *internal tasks* and *external tasks*. Internal tasks are the tasks that the user must perform when using the computer, for example pressing certain sequences of keystrokes, and external tasks are the tasks the user can perform with the artefact when knowing how to perform the internal tasks, for example writing. However, HCI is not only about understanding the tasks that users perform in order to design a technology based on a set of requirements; it is also about understanding how these new technologies create new possibilities or pose new constraints for those who perform a task, thus changing the task and, in turn, creating the need to redesign the technology. This is captured by the task-artefact cycle which is a central framework in HCI (cf. Figure 3).

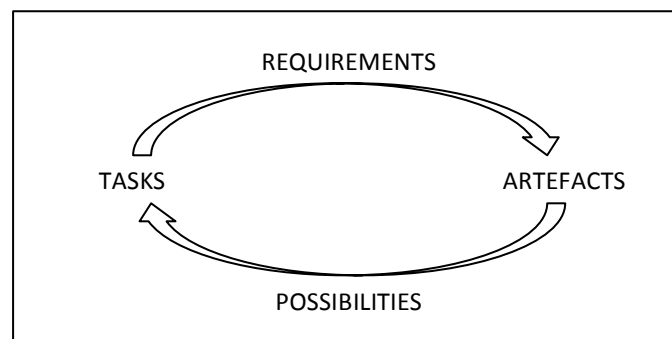


Figure 3. The task-artefact cycle (based on Carroll et al. 1991, p.80)

The task-artefact cycle captures the view that HCI is about understanding tasks as setting requirements for the development of artefacts (Carroll et al. 1991, p.79; Johnson 1992, p.7).

Artefacts are designed in response to these requirements, but do more than merely respond; using them redefines the original task (Carroll et al. 1991, p.79; Johnson 1992, p.7; Carroll 1997, p.78; Monk & Gilbert 1995, p.5). As stated by Carroll, “[t]hrough the course of their adoption and appropriation, new designs provide new possibilities for action and interaction. Ultimately, this activity articulates further human needs, preferences, and design visions” (2013). In other words, tasks and artefacts co-evolve; they cyclically influence each other (Johnson 1992, p.7). According to Johnson, interaction between user and artefact can be thought of as a kind of dialogue in the sense that:

“[t]he program must communicate to the user the results and feedback of activities that are being, or have been, carried out, as well as requests for further actions, while the user must instruct or program and enter data or information into the computer system” (Johnson 1992, p.1).

In this way, user and artefact work together, or interact, to perform a task. In this respect, cognitive ergonomics is an area of interest within HCI, since the goal is to produce systems that support cognitive work in interaction with an artefact.

In aiming to understand the dialogue between users and artefacts, it has been natural for HCI to draw on psychological theories and methods (Carroll 1991, p.1; Carroll et al. 1991, p.74; Johnson 1992, p.3). In the beginning, studies of people using computers were assumed to provide the basis for discovering the “grammar of the head” and thus the basis for developing cognitive models of users’ activities. With such models as the starting point, it was hoped that it would be possible to design a system mirroring the cognitive processes of the user (Heath et al. 2000, p.302). Such studies were primarily experimental and studied individual humans in isolation from their contexts, i.e. in laboratory conditions (Monk & Gilbert 1995, p.5; Carroll 1997, p.75ff.). This approach has been subject to sustained criticism, among other things because of the “dubious assumption that if we understand laboratory tasks that are devoid of practical meaning we will have achieved a general understanding, not limited to just a single meaningful context” (Carroll et al. 1991, p.82). In their criticism, Carroll et al. go so far as to continue: “This is probably about half right: These analyses are in many cases not applicable to a single meaningful context in human experience” (1991, pp.82–83). Also, such studies were criticized for ignoring the user’s prior knowledge, task context and goals (Carroll et al. 1991, p.74). Thus, new voices entered the HCI discussion, stressing that laboratory studies “were ill-equipped to provide insights on the everyday experience of using (interacting with) new technologies” (Blomberg 1995, pp.177–178), urging instead acknowledgement of the social context in which technologies are used. In this new era of HCI (Carroll 2013) or “turn towards the social” (Luff et al. 2000, p.11), interaction with computers is viewed as being socially and materially embedded in context (Carroll 2013) and therefore such studies focus on “in situ technologically mediated conduct” (Luff et al. 2000, p.17). The computer system is no longer seen as “an island” (Norman 2009, p.54), and approaches such as situated and distributed cognition have made important contributions to the field of HCI (Carroll 1997, p.74; Luff et al. 2000, p.14). This shift has also given rise to ethnographically inspired studies within HCI, often referred to as “workplace studies”. Thus, there are many parallels between the developments in HCI with

the development in TPR in terms of how cognition is viewed and in terms of the change in applied methods.

3.2.4 Machine Translation-assisted Translation Memory translation as Translator-Computer Interaction

As a consequence of her characterization of translation as a form of HCI, O'Brien (2012) coined the term *Translator-Computer Interaction* (TCI). Thus, within TPR, we may describe studies interested in the CAT process as studies of TCI. In this thesis, focus is on translation processes involving human translators and an artefact in the form of an MT-assisted TM tool, translation processes which are viewed as instances of TCI.

Several of the concepts from HCI are relevant in a CAT context. For example, in Norman's (1991) terms, if we take a system view of the interaction between a translator and a CAT tool, we may assume that the use of a CAT tool increases the translator's productivity in the sense that the translator probably accomplishes the task of translating faster than would be possible without the tool. This would seem to be the main justification for integrating MT into TM tools. On the other hand, if we take a personal view, from the translator's own perspective, the translator might not feel that the use of the tool enhances his or her cognition compared to translating without the tool, but rather that he or she is confronted with a changed task. The notion that artefacts influence the way translators work is inherent in the approaches mentioned above that view translation as a context-dependent, situated activity, and several studies in TPR have shown that the use of CAT tools changes the cognitive translation process (cf. e.g. Dragsted 2006; Alves & Liparini Campos 2009; Christensen 2011; Christensen & Schjoldager 2011). Along the same lines, Garcia states that, in the context of TM translation, "the practice of translation and revision for localization is being shaped by the needs of a new and unprecedented type of user: the TM apparatus itself" (2008, p.49). The use of CAT tools to solve the translation task may highlight potential improvements in the tools, and CAT tools are and have been continuously redesigned to include additional aids and features, such as MT and the AutoSuggest feature. Although some scholars have questioned whether the tools are, in fact, designed and redesigned with translators in mind (cf. e.g. O'Brien 2012, p.115), we recognize the notion from the task-artefact cycle that the translation task sets requirements for the artefacts and that the artefacts influence the way translators work. With each redesign or newly included feature, the translator is presented with a changed task (from Norman's personal view) and has to, in HCI terms, learn new internal tasks to perform the external task of translating. This is echoed by Garcia when he states that "TM is an obtrusive tool that translators need to learn and adjust to before they can achieve the gains in productivity and consistency (which relates to quality) it promises" (2008, p.55).

In support of the view that the CAT process is an instance of TCI, O'Brien argues that MT is a prime example of interaction between a translator and a computer, since "[a] human, using a computer, sends a sentence to the MT system and, within milliseconds, the sentence has been translated by a program into another language" (2012, p.106). Here, we sense the kind

of dialogue between human and artefact articulated by Johnson (1992, p.6). However, Alves et al. (2016, p.80) argue that in scenarios where a source text is pretranslated using MT and then edited by a translator, there is no actual interaction between the MT system and the translator. Their argument is that, contrary to the interactive post-editing condition they are testing, in traditional post-editing of MT output, the MT system does not learn from the translator's implemented edits and does not propose new translations on the fly; thus, according to Alves et al., there is no actual interaction. However, in an MT-assisted TM tool, I would argue that interaction between the translator and the artefact is pronounced. Firstly, the translator's process of editing the provided matches constitutes interaction, since, typically, when a translator has edited a match (produced by an MT system or retrieved from the TM), the translation is immediately included in the TM and can be retrieved if an identical or similar segment occurs later in the same text. Furthermore, edits implemented by the translator in previous translation tasks are typically channelled back to the MT system and used to retrain it "so it can 'learn' from its mistakes and from the human's corrections" (O'Brien 2012, p.106). Thus, the translator's "response" is used to improve the artefact's later translation suggestions provided to the translator.

Also related to translation as a form of HCI, TPR has recently seen growing interest in the ergonomics of the translation workplace: among other areas, cognitive ergonomics related to translators' interaction with translation tools (cf. e.g. O'Brien 2012; Ehrensberger-Dow 2014; Ehrensberger-Dow & O'Brien 2015). Here, it is considered that identifying points of so-called cognitive friction, defined by Cooper as "the resistance encountered by a human intellect when it engages with a complex system of rules that change as the problem changes" (2004, p.19) and by Ehrensberger-Dow and O'Brien as "a state of being when "flow" is disturbed" (2015, p.102), may improve the cognitive ergonomics of translation tools and thereby increase translators' job satisfaction. Thus, results of TPR studies which focus on TCI may impact on the development of the tools of the trade and contribute to the applied branch of TS in Holmes' map, by identifying "the specific requirements that aids of these kinds should fulfil if they are to meet the needs of practicing and prospective translators" (Holmes 2000, p.189).

Based on the above, I regard the CAT process in the form of MT-assisted TM translation as a context-dependent TCI process. Thus, the thesis investigates MT-assisted TM translation as TCI, and is situated within the fields of TS and TPR.

3.3 Methods in Translation Process Research

In the following, I describe the methods typically applied in TPR; I shall draw on this description in the literature review in Section 3.4 of previous studies that have relevance for the current thesis.

Reflecting the primary focus on internal processes as mentioned above, studies in TPR have traditionally used methods such as verbal reports (think-aloud protocols and retrospective interviews), keystroke logging, screen recording and eye-tracking (Saldanha & O'Brien 2013). Saldanha and O'Brien refer to such studies as examples of "process-oriented research". In the beginning, these methods were primarily used in laboratory settings, but most of them

are now also used in workplace research. With increasing recognition of the context-dependence of the translation process, qualitative methods such as semi-structured interviews and participant observation are increasingly employed to study translation in workplace settings. Saldanha and O'Brien refer to this type of research as "context-oriented". In TPR, there is general consensus that triangulation is necessary and that the combination of qualitative and quantitative data is fruitful (Alves 2003; Krings 2005, p.352; Göpferich 2008, pp.66–67; Dam-Jensen & Heine 2009, p.11; Saldanha & O'Brien 2013, p.109; Ehrensberger-Dow 2014, p.366; Jakobsen 2014, p.65). Thus, typically, a number of methods are combined in one study. However, as pointed out by Dam-Jensen and Heine, triangulation cannot remove the disadvantages of the different methods, but it can contribute to obtaining "a rich and more detailed picture" (2009, p.12). In the following, I will first comment briefly on qualitative methods increasingly being employed to take into account the context-dependence of the translation process, and next, I shall comment on more traditional TPR methods which are both qualitative and quantitative.

3.3.1 Context-oriented Translation Process Research methods

A number of scholars have called for more research into translation in its authentic setting to take into account the fact that the translation process is context-dependent. However, this is a quite recent development and no single way of researching this has been established. As stated by Risku, "[s]cholars of cognitive translation studies have only just started to develop and pilot new research designs that have the potential to cope with the overwhelming changes in research methodology needed to study situated, embodied and extended cognition" (2014b, p.336). Thus, we are still at an early stage of exploring translation as a situated activity. However, several scholars have suggested the application of ethnographic methods, including interviews, participant observation and document collection (Risku 2010, p.107; Christensen 2011, p.156; Hubscher-Davidson 2011; Olohan 2011, p.353; Risku 2014b, p.336), using **qualitative, semi-structured interviews**, for example, to inquire into translators' perspectives on translation processes and their use of technology. **Participant observation** has also been applied to observe translators at work as well as other actors involved in solving translation tasks, for example project managers, during which the researcher takes notes. Also, collecting **documents** from a workplace setting may contribute to gaining insight into the translation context. Qualitative methods such as these have sometimes been used alone and sometimes in combination with the more traditional TPR methods described in the next section.

3.3.2 Traditional Translation Process Research methods

Methods which have commonly been used to study internal translation processes are think-aloud protocols, keystroke logging, screen recording, eye-tracking, observation protocols and retrospective interviews. In Krings' (2005) terms, think aloud protocols, keystroke logging, screen recording, eye-tracking and observation protocols are *online* methods since they elicit data during the translation process, whereas a retrospective interview is an *offline* method, since such data are elicited after the translation process has ended. Further, Krings refers to think aloud protocols and retrospective interviews as generating *verbal-report data*

and to keystroke logging, screen recording, eye-tracking and observation protocols as methods for *observation of translator behaviour*.

Think aloud protocols provide verbal-report, online data. When thinking aloud, translators are asked to perform a translation task and at the same time, “verbalize whatever crosses their mind during the task performance” (Jääskeläinen 2010, p.371). The transcripts of these verbalizations are referred to as *think aloud protocols*. Think aloud was applied by pioneers within TPR (Krings 1986; Gerloff 1988; Lörscher 1991) and has been an important research method in TPR (Saldanha & O’Brien 2013, p.124). According to Ericsson and Simon (1980; 1984), the primary advantage of think aloud is that translators verbalize their cognitive processes while the information is still in their short-term memory and verbalization is thus assumed to reflect underlying cognitive processes. In this context, Göpferich states that “es bis heute keine Methode gibt, mit der man mehr Aufschluss über komplexe mentale Problemlösungsprozesse bekommen kann” (2008, p.22) (“until today there is no other method by means of which you can get more information about complex mental problem-solving processes”). However, think aloud has been criticized for a number of reasons. First, a slow-down effect has been confirmed by scholars such as Krings (2001) and Jakobsen (2003). Second, there is the risk that the task of verbalization changes the very processes the researcher seeks to investigate (Saldanha & O’Brien 2013, p.123), a phenomenon referred to as “reactivity” (Jakobsen 2014, p.70). For example, Krings (2001) showed that the translators who were asked to think aloud made twice as many revisions in the target text and processed texts in smaller units than translators that did not think aloud. Also, think aloud is problematic with regard to ecological validity, particularly in a workplace context, where it would (at least for translators working in open office environments) be unnatural for translators to verbalize their thoughts while translating as well as disturbing to their surroundings.

Keystroke logging is a form of observation of the translator’s behaviour during translation by means of a computer protocol (Krings 2005). Keystroke logging software records all the translator’s keystrokes and mouse actions and the pauses between these, producing a log file which can be presented in different ways after the translation process (for example, as a so-called *linear representation*). The log file can also be used to replay the translation process at different speeds. A number of keystroke logging programs have been developed (for an overview of keystroke logging software, see, for example, Spelman Miller & Sullivan 2006, p.6 ff.). However, Translog, developed by Jakobsen and Schou at Copenhagen Business School, has, according to Saldanha and O’Brien, “provided an important impetus for the method of keystroke logging” (2013, p.132) in TPR, and Inputlog (Leijten & Van Waes 2006; Leijten & Van Waes 2013), originally developed for writing research, has since been used in TPR. Both programs are unobtrusive in that they do not interfere with the translation process, but they are quite different in the sense that when using Translog, translators need to work in a special editor, whereas Inputlog can log activities in other environments as well, although with some restrictions (this will be further addressed in Section 4.3.1.1.3.1.4.2.1). In relation to the use of keystroke logging for investigating translation processes when CAT tools are applied, several researchers have experienced problems due to lack of

compatibility of the logging software with commercially available CAT tools (cf. e.g. Mesa-Lao 2011; Ehrensberger-Dow 2014 and Section 4.3.1.1.3.1.4.2.1 in this thesis).

Screen recording is another type of computer protocol used to observe the translator's behaviour during translation. Screen recording software records everything or chosen parts of the translator's screen during the translation process and produces a movie file that can be replayed afterwards at a preferred speed. In addition, depending on the specific choice of software, the translator's verbal utterances and even facial expressions can be recorded. A particular advantage of applying screen recording is its ecological validity: the software is not visible to the translators and they can go about the translation process as they normally would. However, as mentioned by Göpferich (2008, p.54) and Christensen (2011, p.143), an important shortcoming of this method is that it cannot register which parts of the screen the translators are focusing on.

This problem may be solved by applying **eye-tracking**, another online method for observing translator behaviour. An eye-tracker records what the translator looks at and for how long, as well as the translator's eye movements from one part of the screen to another (Göpferich 2008, p.56; Saldanha & O'Brien 2013, p.136). For example, eye-tracking has revealed interesting results with regard to cognitive effort while translating (cf. e.g. O'Brien 2007). The use of eye-tracking is based on the so-called *eye-mind hypothesis* formulated by Just and Carpenter (1980) which posits that there is no appreciable lag between what a person fixates on and what the brain is processing. The most commonly used eye-tracker in TPR resembles a standard computer monitor (Saldanha & O'Brien 2013, p.136). However, eye-tracking can be problematic in a workplace context for several reasons; for example, according to Saldanha & O'Brien (2013, p.138), it can be cumbersome moving eye-trackers around, and the computer connected to the eye-tracker also needs to have tracking software installed as well as a suitable operating system and graphics card. Therefore, Saldanha & O'Brien (2013, p.138) state that the easiest solution is to ask translators to use a specific computer which has the desired properties and to which the eye-tracker is connected. This, however, reduces ecological validity as translators will not be familiar with the computer, keyboard etc. Furthermore, variation in light intensity is undesirable, sound has an impact on pupil dilation, caffeine and heavy eye make-up can affect pupil size, and translators should be seated at exactly the same distance from the monitor and should not alter their head position significantly during translation (Saldanha & O'Brien 2013, pp.138–139). Also, only rather short texts can be used when eye-tracking is applied, among other things because of the large amount of data the eye-tracker generates which may slow down the computer and because scrolling is undesirable. Also, for reasons of accuracy, the font size has to be made considerably large (typically a 14-16 point font size) and double line spacing should be used, and typically, these aspects do not correspond to the software usually used by translators (e.g. commercial CAT tools).

Observation protocols are, according to Krings (2005), the simplest form of behaviour observation. The researcher observes the translator during translation and notes observable and audible actions (e.g. the use of hard copy dictionaries or the translator talking to

him/herself or to others). This method is often used in conjunction with application of other online methods, such as screen recording.

Finally, a **retrospective interview** is a verbal-report method used after a translation process. In retrospective interviews, translators are asked to give a retrospective verbal report of their cognitive processes during a specific translation task. This interview can be immediate or delayed, depending on whether it is conducted immediately after the translation process or after a longer time-interval. According to Ericsson and Simon (1980; 1984), retrospective interviews have the disadvantage that only information recently attended to can be verbalized (since it is still in the short-term memory). Thus, it might not be possible for a translator to verbalize his or her cognitive processes because the information needed has to be retrieved from long-term memory. This process entails a risk that the translator might have forgotten some information and/or that the translator infers missing information or generalizes incomplete memories (Ericsson & Simon 1980, p.243; Ericsson & Simon 1984, p.19; Göpferich 2008, p.34). In order to address this potential problem, a retrospective interview is often *cued* in the sense that the translator is shown a video of his or her process to trigger the memory (Englund Dimitrova 2010, p.407; Hansen 2013b, p.91; Englund Dimitrova & Tiselius 2014, p.180). Such a cue “can provide very powerful reminders to participants about the nature of their engagement in a task” (Saldanha & O’Brien 2013, p.125).⁶ Another risk that has been articulated is that participants might not be able to verbalise their processes if the task has become routine, because overlearned processes operate automatically without leaving a trace in short-term memory, a phenomenon referred to as *automaticity* (Ericsson & Simon 1980, p.236; Ericsson & Simon 1984, p.15; Göpferich 2008, p.19; Christensen 2011, p.144; Saldanha & O’Brien 2013, p.123)(Saldanha & O’Brien 2013, p.123; Ericsson & Simon 1980, p.236; Ericsson & Simon 1984, p.15; Göpferich 2008, p.19; Christensen 2011, p.144). If this is the case, participants may only verbalize the final result of their cognitive processes. In a translation context, this could, for example, be what translation of a specific term they decided on and not their thoughts about potential alternatives. However, an advantage of retrospective interviews is that they do not interfere with the process we seek to investigate because retrospective interviews are carried out after the translation process itself. Furthermore, Ericsson and Simon point out that instructing the participant – in TPR, the translator – to report everything he or she can remember from performing the task, generally reduces the risk that the translator constructs or infers processes that were not closely related to the actual cognitive processes heeded during the translation process. Along the same lines, Ericsson and Simon recommend instructing subjects “to only report details that they remember heeding at the time of the original episode” because this may eliminate many people’s “tendency to fill in information that they can’t remember, but “must” have thought” (1984, pp.19–20). In TPR, several researchers point out that retrospective data should not be used as the only source of data on a translator’s cognitive processes; rather they should serve as a qualitative supplement to data collected using other methods (O’Brien 2007, p.200; Christensen 2011, p.144; Englund Dimitrova & Tiselius 2014, p.196; Muñoz Martín 2014, p.63).

⁶ However, Englund Dimitrova and Tiselius (2014, p.180) point out that there is a risk that the cue used to prompt the translator’s memory might actually “install” false memories.

Each of the methods described above has its advantages and disadvantages, so the combination of methods must depend on the research question and the research setting (Saldanha & O'Brien 2013, p.22). In any case, as mentioned above, since the cognitive processes in Muñoz Martín's (2010b) first level are non-observable, the cognitive processes underlying the observable actions can only be inferred by the researcher (Christensen 2011, p.142; Jakobsen 2014, p.65). Also, a number of scholars have argued that through a combination of traditional TPR methods and the context-oriented qualitative methods described in Section 3.3.1, a more comprehensive picture of the translation process can emerge (Hubscher-Davidson 2011; Olohan 2011; Risku, Windhager, et al. 2013; Ehrensberger-Dow & Massey 2015). Olohan addresses this specifically with regard to translators' interaction with technology and states that:

"[i]n order to investigate this interplay as it emerges we must draw on ethnographic methods of inquiry. Direct observation and field notes could be combined with data collected from keystroke logging and/or eye tracking to give a fuller picture of the interaction" (Olohan 2011, p.353).

As noted by Risku et al. (2013, p.172), the miniaturization of observation technology (such as screen recording, keystroke logging and eye-tracking) increases the possibility of carrying out such studies *in situ* while also improving ecological validity. Furthermore, methods used for studying the translation process may be combined with analysis of the translation *product*.

3.4 Literature review

This section seeks to identify, summarize and, where relevant, criticize the literature relevant for this thesis, synthesize the findings and point out emerging research gaps (Saldanha & O'Brien 2013, pp.19–20). When summarizing the previous research, I shall draw on the description of TPR methods in Section 3.3.

Taking the purpose and research questions as well as the theoretical standpoint of the thesis as the point of departure, in the literature review, I am specifically concerned with 1) studies that have investigated TCI as a context-dependent activity, i.e. studies that have investigated TCI in the workplace setting in which it unfolds, and 2) experimental studies that have investigated MT-assisted TM translation. Although the distinction is not clear-cut, the former type of studies are mainly qualitative studies drawing on the ethnographically inspired methods mentioned in Section 3.3.1 and focus on authentic translation tasks, whereas the latter are mainly quantitative studies and draw on the traditional TPR methods described in Section 3.3.2. These two approaches to studying TCI resemble Norman's (1991) views of artefacts which were related to a CAT context in Section 3.2.4. For example, the studies taking experimental approaches to studying MT-assisted TM translation can be said to take more of a system view of translators' interaction with an artefact in the sense that they often focus on what the translators can accomplish with the artefact, accomplishments which are often measured in terms of translation speed and quality. On the other hand, the

studies investigating TCI as a context-dependent activity can be considered to reflect a perspective similar to Norman's personal view of HCI, focusing on how the individual translator interacts with a CAT tool and how the translator views this interaction. Again, the distinction is not clear-cut, since, for example, experimental studies may also be concerned with individual translators' perspectives on TCI, so it is more a question of primary focus rather than either/or. In the literature review, I only include studies concerned with translator attitudes to TCI (relating to RQ7) if they fall under one of the two types of studies I have outlined. Many other studies have been conducted touching on translator attitudes to technology, often in the form of surveys (cf. e.g. Dillon & Fraser 2006; Lagoudaki 2008; Marshman 2012; Moorkens & O'Brien 2013; Christensen & Schjoldager 2014; O'Brien & Moorkens 2014), but these are not reviewed here (cf. e.g. the brief review of studies of translator attitudes in Bundgaard (in press)).

Following from the above, the literature review is structured into two main sections: Section 3.4.1 reviews studies investigating TCI as an authentic context-dependent activity, and Section 3.4.2 reviews experimental studies investigating MT-assisted TM translation. Thus, as recommended by Saldanha and O'Brien (2013, p.20), the review is structured along thematic lines. Further, the studies in Section 3.4.2 are amalgated into the common themes of *editing speed*, *amount of editing*, *quality* and *self-revision and review* under which the core findings on the respective themes are synthesized (Saldanha & O'Brien 2013, p.20), all of which are relevant to the research questions explored in this thesis. This has the consequence that studies may feature under more than one theme. In all sections and subsections, studies are described in chronological order. In Section 3.4.3, the findings of the reviewed studies are synthesized by relating them to the research questions of the thesis, and emerging research gaps are identified.

3.4.1 Translator-Computer Interaction as an authentic context-dependent activity

In this section, I shall summarize studies which have investigated TCI as a context-dependent activity, i.e. studies focusing on authentic TCI as it unfolds in the workplace context and studies which are mainly qualitative in nature.

Désilets et al. (2008) and **Désilets et al. (2009)** were concerned with understanding the work practices of translators based on the perception that such knowledge can be leveraged in the design and redesign of translation technology, which can thereby be "well grounded in actual end-user needs and context" (Désilets et al. 2008, p.340). Désilets et al. drew explicitly on the field of HCI. In both studies, they applied the method of Contextual Inquiry, a one-to-one field interview conducted where and when the work is done, which they described as an ethnographic approach. In Krings' (2005) terms, Contextual Inquiry could be characterized as an online method and a mixture of observing translator behaviour and obtaining online verbal-report data. In Désilets et al. (2009), the authors actually characterized Contextual Inquiry as a form of think aloud. The 2008 study was based on Contextual Inquiries with 11 professional translators and the 2009 study was based on Contextual Inquiries with 8 professional translators working in different environments (e.g. freelancers and translators employed in LSPs or academia). In both studies, the authors

reported on how rich information about translators' work can be translated into design ideas and priorities. In the 2009 study, focus was specifically on how translators use linguistic resources to solve encountered problems.

Désilets et al. found that the translators used many different tools and resources, for example, termbases, TMs, Web sites and dictionaries. They also found that terminology problems are the most common type of translation problem and that translators used more bilingual resources than unilingual ones. The authors also stated that translators seemed to care more about recall than precision when they consulted a resource, meaning that translators did not mind seeing a list of mostly poor suggestions as long as it also contained a few good ones, since they are highly skilled at quickly scanning a list of potential solutions. Also, the authors argued that the translators exercised a high degree of critical judgement in deciding on solutions based on the observation that in 35% of cases, translators continued searching after they had already found relevant information in one resource. Désilets et al. also found that the translators consulted corpus-based resources (including TMs) in 59% of the cases where they encountered a translation problem. However, it remains unclear whether the participating translators translated in a CAT tool including a TM during the Contextual Inquiries and if so, whether the authors deemed that the TM was specifically consulted to solve a translation problem (which could be in cases where concordance searches were carried out), or whether the translators translated in another environment and were able to consult TMs as additional linguistic resources.

Désilets et al. mentioned different ways in which the findings can be transformed to specific design ideas. For instance, they suggested that tool developers aimed at providing unified interfaces to multiple linguistic resources. The authors also argued that studies focusing on measuring the productivity gains of MT were important, but that such studies were more focused on the needs of managers than those of translators, stating that it was equally important to understand how translators conducted and experienced the interaction with the CAT tool. Along the same lines, Désilets et al. suggested that the field of MT adopt a more user-centered approach.

Similarly, **Karamanis et al. (2010)** and **Karamanis et al. (2011)** claimed to take a "broader view" of the translation process than studies on performance gains when applying MT. In doing so, they drew on HCI and on distributed cognition. Karamanis et al. aimed at learning more about translators' actual work practices by providing an "eye-witness account" of translation practices, in particular which problems translators encountered, how they solved them, which tools they drew on, and how they collaborated with others involved in the observed activities. To this end, like Désilets et al. (2008; 2009), Karamanis et al. applied the method of Contextual Inquiry. The 2010 study was based on Contextual Inquiries with 6 professional translators and the 2011 study on Contextual Inquiries with 13 professional translators employed at LSPs.

Karamanis et al. found that the main tool used by the translators was the TM system, SDL Trados, and that translators often used keyboard shortcuts to accept translations and move to the next segment. When faced with a problem, a concordance search was normally the

first step translators took, mostly searching for subparts of the segment they were working on. A concordance search was typically performed using a shortcut. When the concordance search did not give the answer, translators consulted reference materials. If such material was not available or helpful, translators did research online. Karamanis et al. found that results of an online search were scrutinized, and that accepting a translation from an online search required extra steps of verification compared to accepting a team member's translation. For example, results of a first online search were confirmed through additional searches. Thus, as observed by Désilets et al. (2008; 2009), it seems important to translators to use trustworthy sources, and online sources are trusted less than, for example, contents in the TM. Karamanis et al. also found that translations produced by freelancers were trusted less than translations produced by other in-house translators because freelancers are not full participants in the LSP setting. Generally, Karamanis et al. found that translation was a collaborative task with communication between in-house translators playing an important role in solving translation problems. On the other hand, communication with freelancers and the client was more constrained.

Karamanis et al. related their findings to the implementation of MT and stated that perhaps the ultimate challenge for MT was to be trusted as much as a team member. For translators, MT might remain a black box; translators do not know why the MT acts as it does, and Karamanis et al. stated that providing translators with more information about the origins of a translation might thus be important to successful implementation of MT. One translator also noted that using MT was risky because the MT engine draws on TMs for different products and if a translator is tired, he or she might think that the match is correct when it is not. Karamanis et al. pointed out that workplace observations might "focus research and development efforts on addressing problems actually encountered in the workplace instead of introducing technology based on assumed needs" (Karamanis et al. 2010, p.250) which is in line with the focus of HCI being on in situ interaction between users and computers as the basis for the design and redesign of artefacts.

Olohan (2011) also ascribed importance to viewing TCI as an interplay between a human translator and an artefact. She applied Pickering's "mangle of practice" theory in her analysis of translators' authentic interactions with TM software as they manifested themselves in translators' contributions to an online forum. Pickering's (2005) "mangle of practice" represented the dialectic of resistance and accommodation between human and non-human agents, for example between a scientist and a machine. In the interplay between these agents, which Pickering referred to as a "dance of agency", an agent might offer resistance which was accommodated by the other agent. For example, a new machine might offer resistance in the sense that it did not perform as intended by the scientist, and the scientist might then accommodate this, for example, by changing the material form of the machine. With this theoretical perspective as her point of departure, Olohan viewed CAT as interaction between a human agent (translator) and a non-human agent (the technology) characterized by resistance and accommodation. Thus, for instance, while the CAT tool was generally expected to aid and support the translation process, it might also restrain the process in several ways. In order to accommodate the resistances offered by the tool, translators might need to carry out certain actions enabling the ongoing interaction between

the tool and the translator to progress (see also Bundgaard et al. 2016; Bundgaard in press). The perception that a CAT tool may offer resistance in the translation process appears to be paralleled in the growing interest in TPR in cognitive ergonomics related to TCI and in identifying points of cognitive friction (cf. Section 3.2.4).

Olohan analysed a discussion thread in the online forum which concerned the launch of SDL Trados Studio 2009, a new and redesigned version of the TM tool produced by SDL. In the thread, translators posted comments related to the CAT tool “to facilitate or improve their own or someone else’s further interaction with the TM software” (Olohan 2011, p.346). In her analysis, Olohan focused primarily on one translator, the thread initiator, and found that the translator ascribes human qualities to the software by, for example, stating that the software “forgets” where something has been stored. This was interpreted as an example of resistance offered by the tool as were the translator’s comments that the software did not do what he expected it to do. The translator had to accommodate these resistances in order for the interaction to progress. Olohan concluded that it was fruitful to view interaction between translators and technology from Pickering’s perspective, but also that more direct observation of TCI was required (rather than analysis of translators’ written accounts of the interaction, such as in an online forum). As mentioned above, she suggested that researchers apply ethnographic methods in combination with more traditional TPR methods such as keystroke logging and/or eye-tracking and stated that such studies should be carried out in workplace settings and focus on authentic translation situations. For example, identifying resistance and accommodation when new translation technology is implemented may indicate ways in which the technology should be redesigned. The current thesis takes a perspective similar to Olohan’s, particularly when addressing RQ7, and in doing so also points to potential technological improvements.

In **LeBlanc (2013)** and **LeBlanc (2017)**, LeBlanc reported on an ethnographic study conducted in 2012 in three Canadian translation service providers (TSPs) in Canada, which employ between 14 and 36 translators and revisers. LeBlanc conducted semi-structured interviews with translators and management, and observed professional translators at work. In the 2013 paper, LeBlanc paid particular attention to the advantages and disadvantages of TMs from the translators’ perspective and in his 2017 paper, he focused on the shifts in business practices that have followed the implementation of TM and the impact these have had on translators’ work and professional satisfaction.

LeBlanc’s studies showed that all three TSPs used TMs, that the use of TMs was not optional to the translators, and that TMs were used for nearly all texts. Advantages of TMs mentioned by translators were, for example, that TMs increased productivity and improved consistency as well as eliminated uninteresting and repetitive work. Further, TMs were used as searchable databases by the translators. Although LeBlanc did not state this explicitly, this seems to refer to concordance searching in the TM, which the translators often use instead of other resources. Hence, according to LeBlanc, many translators considered the TM as a “one-stop shop”. This is in line with the findings by Karamanis et al. who found that the concordance search is the first step when translators encounter a translation problem. The main disadvantage mentioned by the translators was the sentence-by-sentence approach,

which required them to work with segments instead of whole texts. For example, translators noted that the process of combining, splitting and moving about sentences was complicated in this environment and that the sentence-by-sentence approach altered the mental translation process and turned translation into sentence replacement. Further disadvantages indicated by translators were that TMs were a barrier to creativity, that they made translators lazy and increasingly passive in that TM became the sole tool used for decision-making and that they made translators not trust their professional instincts as much as they used to.

Three further disadvantages were identified by LeBlanc, namely that TMs resulted in increased productivity requirements for translators, that translators might be forced to reuse matches and that the increased automation of translation might lead to a decrease in translators' professional satisfaction. In all three TSPs, productivity requirements increased, i.e. translators were expected to translate more per hour than prior to TM implementation. In two of the TSPs, new business practices also meant that it was not up to the translators to decide whether they wanted to reuse the matches provided by the TM; rather, they were required to reuse 100% matches and substantial fuzzy matches (75-99%) exactly as they were retrieved, a phenomenon referred to by LeBlanc as *enforced recycling*. LeBlanc added that matches must be reused "except if they are deemed unusable" (2017, p.50) and that, when a match was unusable, the translator needed to get a supervisor's permission to edit the match. This, however, seems quite laborious since we must, for example, expect that at least parts of many 75% matches are unusable and thus I wonder whether LeBlanc's description is a bit unclear. However, translators could in fact be reprimanded for editing matches for purely stylistic reasons without permission. The underlying reasoning was that there was no point in reinventing the wheel and that the TSPs wanted to avoid multiple matches being retrieved for the same segment. A few translators found enforced recycling logical, whereas many found that it limited their control over the target text and their decision-making authority. LeBlanc found that translators generally experienced a loss of professional autonomy and a decline in professional satisfaction following TM implementation and new business practices, and therefore suggested that we focus more on the human aspects of TCI. This seems to be in line with the growing interest in TPR in the cognitive ergonomics related to TCI which ultimately aims at increasing translators' job satisfaction.

Ehrensberger-Dow (2014) and **Ehrensberger-Dow and Massey (2014)** reported on a workplace study conducted as part of the so-called Capturing Translation Processes study, which was a longitudinal study that investigated the translation processes of both student and professional translators in laboratory and workplace settings. In the following, I focus on observations related to the workplace study in which screen recording, retrospective interviews, questionnaires and semi-structured interviews were applied. Thus, this study combined traditional and context-oriented TPR methods.

Ehrensberger-Dow and Massey (2014) were specifically concerned with the cognitive ergonomics of computerized workplaces. The authors argued that "[h]umans and machines can reasonably be considered to impact on and adjust to each other in order to respond to

disturbances and meet new demands [...] However, systems can sometimes react inappropriately” (Ehrensberger-Dow & Massey 2014, pp.63–64). This view of the interaction between translators and technology seems to reflect the basic notion in HCI that the interaction between the user and the computer may be thought of as a dialogue, and we also identify parallels with Olohan’s conceptualization of the interaction between a human and a computer as a process of resistance (with, for example, systems reacting inappropriately) and accommodation (with humans and machines adjusting to each other).

Their findings included the observation that professional translators had many windows and tabs open during translation, including a TM system and many other resources. This required quite a lot of switching between the different resources. In both papers, the authors found that translation tools might constrain the translation process and limit translators’ autonomy since even simple decisions had to be checked against the contents in, for example, TMs and style guides. It was only after checking against other resources that it seemed appropriate for translators to make their own decisions. As stated by Ehrensberger-Dow, “[i]t 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” (2014, p.375). The translators also made positive comments expressing satisfaction with their tools; however, they also complained, for example, about limited space on their computer screens.

Ehrensberger-Dow and Heeb (2016) reported on a part of the so-called Cognitive and Physical Ergonomics of Translation study, which was a follow-up research project of the Capturing Translation Processes study, that investigated ergonomics in technologized translation workplaces. The authors focused particularly on disturbances and interruptions in one translator’s work and how these affected the translation process. The methods applied were screen and video recordings, interviews, and ergonomic assessments at the workplace.

The Cognitive and Physical Ergonomics of Translation study included translators working as commercial and institutional staff as well as freelance translators. The translators worked in different settings, for example in open-plan offices or alone, and used CAT tools to various degrees. Ehrensberger-Dow and Heeb focused on one translator, namely a commercial staff translator who usually worked in an open-plan office and used a CAT tool regularly. However, on the day she was observed, she worked from home because of security issues with observing her work at her usual workplace. The authors state that this was unfortunate since it may have made the data less representative of her typical work, although she typically worked from home once a week. She was observed solving tasks that were part of her normal work, namely editing five technical texts, and subsequently translating them using the CAT tool, SDL Trados Studio 2011.

Ehrensberger-Dow and Heeb found that the translator was often disturbed by e-mails and phone calls. After these disturbances, she seemed to have trouble continuing with what she was doing before the disturbance. Also, the authors found that the translator did not seem to have the optimal settings in terms of size of the windows she worked in which resulted in

her leaning forward to see the screen. Further, the authors found that the translator tended to ignore the suggestions provided by the AutoSuggest function in the CAT tool, also in cases where she ended up typing the same as the suggested translation. The authors proposed that the translator might have chosen to ignore the suggestions as too many were provided at any one time. The authors concluded that ergonomic observations such as theirs may contribute to optimizing translator-computer interfaces.

3.4.2 Experimental studies of Machine Translation-assisted Translation Memory translation

In this section, I shall review experimental studies which investigated aspects of MT-assisted TM translation that are relevant for the research questions investigated in this thesis. The findings of these studies have been grouped into four overarching themes relating to 1) the speed with which translators edit TM and MT matches (relating primarily to RQ2), 2) the amount of editing the translators perform (relating primarily to RQ5), 3) the quality of the edited matches (relating primarily to RQ1, RQ1a and RQ6) and 4) self-revision and review in an MT-assisted TM context (relating primarily to RQ3, RQ4 and RQ6).

3.4.2.1 Editing speed

As stated by Federico et al., drawing on O'Brien (2011), "improving processing speed is indeed the primary interest of [sic] translation industry as this figure can be directly related to the cost of the translation" (2012, p.2). Hence, most studies of MT-assisted TM translation are interested in the speed with which translators edit TM and MT matches.

One of these studies is **O'Brien (2007)** which investigated the cognitive effort required from translators for TM and MT matches. This she measured on the basis of editing speed and increase in pupil size in an experiment with four professional translators. In the experiment, two translators translated an English source text of 235 words about an anti-virus program into their native language German, and two translators translated the same source text into their native language French, using the CAT tool SDL Translator's Workbench. O'Brien's design differed slightly from the typical MT-assisted TM setup in that, in addition to MT matches, 100% TM matches and different types of fuzzy matches (74-75%, 80%, 90% and 99% matches), she also included *no matches* in her design. O'Brien applied eye-tracking and cued retrospective interviews, i.e. both an online and offline data collection method and both a method for observing translator behaviour and a method for obtaining verbal-report data (Krings 2005). Although it is not explicitly stated, the experiment was most likely conducted in a laboratory setting.

The time spent on each segment was measured by means of the eye-tracking analysis software, apparently by noting starting and ending times for the editing of every segment. Afterwards, editing speeds for the different match types were calculated by dividing the number of words in a segment by the seconds spent editing that segment. Results showed that 100% matches were processed at a faster speed than the other match types and that *no matches* were processed at the lowest speed, thus suggesting that *no matches* required the

most cognitive effort from translators and 100% matches the least. Also, O'Brien found that the editing of an MT match took as much time and cognitive effort as the editing of an 80-90% fuzzy match. O'Brien also found that editing speeds decreased with fuzzy match value, although the speed was slightly higher for 74% than for 80% TM matches. O'Brien attributed this to a limited data set.

Based on O'Brien's (2007) findings, one of the hypotheses formulated and investigated by **Guerberof Arenas (2009)** was that "the time invested in post-editing one string of machine translated text will correspond to the same time invested in editing a fuzzy matched string located in the 80-90 percent range" (Guerberof Arenas 2009, p.12). The study, a pilot study published ahead of Guerberof Arenas' doctoral thesis (Guerberof Arenas 2012, see below), was conducted as an experiment with 8 professional translators. The translators were asked to translate an English source text of 791 words from the localization domain into Spanish using an online post-editing tool unfamiliar to the translators. Like O'Brien's (2007) study, Guerberof Arenas' design differed slightly from the typical MT-assisted TM setup in that translators were presented with TM matches, MT matches *and no matches*. Unlike O'Brien's setup, the translators did not know the provenance of the segments, i.e. whether they came from a TM or an MT engine, and Guerberof Arenas only included TM matches from the 80-90% range. When translating the text, the translators could only see one segment at a time and were not allowed to go back to previous segments. In terms of methods, Guerberof Arenas used the post-editing tool to collect data on the time spent on each segment, which, in Krings' (2005) terms, can be classified as an online method for observing behaviour and, more specifically, as a type of keystroke logging restricted to the collection of data on time. Guerberof Arenas also applied offline methods, namely analysis of the translation product (to obtain data on quality) and a combination of a retrospective and a generalized questionnaire where translators were asked about the experiment and their general experience.

The study showed that translators edited MT matches at higher speeds than they edited 80-90% TM matches and translated from scratch. Thus, Guerberof Arenas' hypothesis was not validated, and the findings were not in line with O'Brien's (2007) results. Furthermore, Guerberof Arenas' study showed that translators edited 80-90% TM matches faster than they translated segments from scratch. Thus, the findings suggest that translators experience a gain in productivity if they use a translation aid and that this gain is higher if they edit MT matches than if they edit TM matches (with a gain in productivity of 25% and 11%, respectively). Guerberof Arenas' study also indicated that faster translators experienced a smaller productivity gain than slower translators when using a translation aid compared to when translating from scratch. The author was also interested in whether technical experience was associated with higher editing speed. She defined technical experience as "a combination of experience in localisation, in knowledge of tools, in subject matter (in this case supply chain), and in post-editing of machine translated output" (Guerberof Arenas 2009, p.18). Guerberof Arenas' findings showed that experience has a clear effect on processing speed, with experienced translators being faster than less experienced.

In terms of ecological validity, it appears problematic that the translators were asked to

translate using an unfamiliar tool, that the translators could only see one segment at a time and were not allowed to return to previous segments. However, since the source text was not a coherent text, i.e. did not consist of consecutive segments, it might have been less relevant in Guerberof Arenas' setup to allow translators to return to previous segments.

Tatsumi (2010) conducted an experiment with 9 professional translators working in an MT-assisted TM environment. Tatsumi's main interest was MT; however, she included a small proportion of TM matches since she wished to study the differences between editing MT and editing TM matches (Tatsumi 2010, p.71). In the following, after describing her research design, I will concentrate on the analyses where Tatsumi focused on MT-assisted TM.

Tatsumi had native speakers of Japanese translate 5,029 words each from English into Japanese. The 5,029 words were distributed over a number of source texts, all of which had been extracted from a user manual of a data storage product developed by the Symantec corporation. The experiment was conducted in the field, enabling the translators to work in their familiar environment. The CAT tool applied was SDL Trados Translator's Workbench, a tool with which the translators were familiar. Tatsumi included TM matches with match values from 75 to 99%. The translators were told that the target text did not have to be stylistically sophisticated. In terms of methods, Tatsumi applied screen recording and in order to measure the time spent on each segment, she drew on a function in SDL Trados Translator's Workbench in combination with a macro devised for the experiment. Furthermore, she asked translators to complete a retrospective questionnaire asking participants for facts about them and their opinions about post-editing and MT. Thus, she applied both online observation methods and generated offline verbal-report data (Krings 2005).

In relation to obtaining data relating to time, SDL Trados Translator's Workbench was able to record the time when a translation segment had last been saved. However, if a segment was opened and closed more than once, the CAT tool would overwrite the previously recorded time with the new time. The mentioned macro was devised to force the CAT tool to save the data every time the translator entered a specific segment. However, this required the translators to use a certain keyboard shortcut (and not, for example, the mouse) to close and open segments, and Tatsumi thus instructed translators to work in this manner. However, Tatsumi still only had the time when a segment was closed and not the time it was opened, and thus had to assume that the time when a translator finished editing a segment was the same as the time the translator started editing the next segment. Tatsumi noted that this does not reflect the exact time spent on each segment, since translators are expected to spend time sipping coffee, stretching shoulders and so on, but added that she was able to consult the screen recording data when she needed to clarify why certain segments had taken translators excessive time (Tatsumi 2010, p.67).

Tatsumi primarily studied the difference between the editing of MT matches and TM matches in terms of temporal and technical effort (for the latter, see Section 3.4.2.2). She operationalized temporal effort as editing speed, which she measured in words per minute. Tatsumi's results showed that the average editing speed for MT matches was at least faster than the average editing speed for 75-79% TM matches for all translators and thus

concluded that MT editing speed was not substantially lower than TM editing speed. Tatsumi's results are highly interesting since the data set is quite large, compared to other studies, and since the experiment was conducted in workplace settings. However, it might have impacted on the results that translators were instructed to work in a certain way (using shortcuts for opening and closing segments), that only data on the closing of segments were obtained and that the translators were told that the target text did not have to be stylistically sophisticated. This might have had a relatively larger impact on the editing speed for MT matches than on the editing speed for TM matches since one might expect it to require more time from translators to turn MT matches into something which is stylistically sophisticated than to do the same with TM matches which have been translated by a human being.

Teixeira (2011) studied MT-assisted TM translation in an experiment with two translators. The study was a pilot study published ahead of his 2014 doctoral thesis (Teixeira 2014b, see below). Teixeira was interested in whether and how translators' behaviour was influenced by the availability of provenance information, i.e. information about whether segments come from MT, TM and, in the latter case, at which match percentage. Teixeira suggested that differences in the presence of provenance information might be one of the reasons for the different findings in e.g. O'Brien (2007) and Guerbero Arenas (2009) (Teixeira 2011, p.108). Teixeira compared two environments; one where the translators did not know the provenance of translation suggestions (blind) and another where they did (visible). Teixeira had two professional translators each translate two similar source texts (approx. 500 words per text), one in each environment. The texts were taken from the same technical text about composite materials in car manufacturing and were translated from English into Spanish, the translators' native language. The CAT tool applied was SDL Trados Studio 2009 Freelance. Both translators used their own laptop computers during the experiment which meant that they could keep their preferred configuration in terms of, for example, keyboard, browser favourites, dictionaries etc. The translators also had access to the Internet. Data were collected using screen recording, keystroke logging and retrospective interviews. Thus, both online and offline methods were applied, and Teixeira observed translator behaviour as well as generated verbal-report data (Krings 2005).

Teixeira hypothesized that the editing speed (measured in words per hour) was higher when provenance information was available to the translator. In order to measure the time spent on each segment, Teixeira manually noted down start and end times for the editing of each segment while watching the screen recordings. Time was counted when translators were typing, thinking, hesitating, or looking at the source text, but not when translators "switched to another window to look up terminology, tried to find a specific function in the tool, or spoke with the researcher" (Teixeira 2011, p.111). Also, time was not counted when the translator "started moving the mouse to go to another application (usually a web browser) outside of the translation environment" or when the translator "moved to the source segment to copy text to be pasted in the browser" (Teixeira 2011, p.111). Time was again counted when the translator returned to the CAT tool. Time spent on searches within the CAT tool (mainly with the concordance function) was included in the time spent on the particular segment.

Teixeira's results are inconclusive with regard to translation speed as one translator was slightly faster in the visible environment and the other slightly faster in the blind environment. However, it is interesting that with both translators, Teixeira saw a dramatic reduction in speed for 100% matches when provenance information was not available. Hence, it seems that the indication that a match is a 100% match affects the translation process considerably in relation to speed.

The fact that the translators used their own computers during the experiment contributed to a high degree of ecological validity in Teixeira's study, as they did not have to familiarize themselves with a new computer with different settings. However, the fact that Teixeira omitted time spent by translators on, for example, looking up terminology outside the CAT tool and using the Internet is questionable. An argument for this approach may be that, due to a potentially uneven distribution of terms in the source text, including this time might influence the data in an inappropriate way. However, such activities are an important part of the translation process and therefore time spent on these should be included, in my opinion. Also, if the translator, for example, encountered a terminological translation problem which was solved by means of the concordance function, Teixeira included the time spent on the concordance search(es), whereas he did not include the time if the translator used the Internet to solve the problem. On the face of it, this seems contradictory. Another plausible explanation might be that Teixeira wished to include only the time spent in the CAT tool itself. However, again, I would argue that activities undertaken outside the CAT tool should also be taken into account. Finally, as noted by Teixeira (2011, p.117), in the checking phase, it was especially difficult to identify which segment the translators were focusing on. Teixeira did not explain how he dealt with cases of doubt, but noted that he was considering eye-tracking as a means of solving this issue.

Skadiņš et al. (2011) conducted an experiment on MT-assisted TM translation as part of the LetsMT! project. They were specifically interested in the potential value of integrating MT and TM within the localization domain and for the language pair English-Latvian, since Latvian is a highly inflected language which might pose difficulties in relation to MT. In the experiment, Skadiņš et al. integrated MT into the CAT tool SDL Trados 2009 and compared two scenarios: one where only TM was employed and one where MT was used in combination with TM, where the aim was to measure the impact of adding MT to the process. The impact was measured in translation performance (number of words translated per hour) and quality (cf. Section 3.4.2.3). The authors did not explicitly state how they measured the time spent by each translator on each task, i.e. whether this was, for example, measured automatically by means of the CAT tool, registered manually by the researchers or self-reported by the translators.

Five professional translators with different levels of experience participated in the experiment which was conducted within a professional localization company, the usual workplace of the translators. The source texts came from the IT domain and were selected from the incoming work pipeline provided they contained between 950 and 1,050 words. Each document was split in half, where the first part of it was translated in the TM scenario

by one translator and the second half in the MT scenario by another translator. Skadiņš et al. did not explain how the tasks were assigned to the different translators, and whether all translators translated an equal number of texts. During the experiment, provenance information was visible to the translators and they were allowed to use whatever external resources they wanted. In the MT scenario, translators were provided with both a TM and an MT match for every source segment for which a 100% match was not found in the TM, and it seems that translators were free to choose which match to work with. Results were analyzed for 46 texts, 23 in each scenario.

Skadiņš et al.'s findings showed that the implementation of MT increased translation speed from 550 to 731 words per hour, on average, corresponding to an increase of 32.9%. The MT system used in the experiment was trained on TMs from a specific client and the experiment contained texts from both this and another client. Results showed that a higher increase in speed was seen for the texts from the client whose TMs were included in the training than for the texts from the other client, with increases in speed of 37% and 24%, respectively.

The study of Skadiņš et al. has high ecological validity, as it was conducted at the workplace and allowed translators to use their usual resources when translating. Also, it is highly interesting to see findings for smaller languages such as Latvian. However, since using MT was new to this company, it can be assumed that the translators' experience with MT was low which may have impacted on the results. Further, it is unclear whether the match values of the TM matches provided in the different texts were comparable. Finally, when arguing for providing the translators with provenance information for each match, the authors stated that this allowed translators to pay more attention to MT matches. They argued that this was necessary since MT output may be inaccurate, ungrammatical and contain wrong terminology, whereas "[t]ranslators are not double-checking terminology, spelling and the grammar of TM suggestions, because the TM contains good quality data" (Skadiņš et al. 2011, p.37). This is, however, not supported by Guerberof Arenas' study (2009) (cf. Section 3.4.2.3), in which a greater number of errors was found in TM matches than in MT matches, supposedly because the translators did not question the TM matches because they flowed more naturally.

Guerberof Arenas (2012) conducted an experiment with 24 professional translators and 3 reviewers. The 24 translators translated a text from English into Spanish, their native language. The source text came from the localization domain and comprised 2,124 words (618 words of TM segments from the 85-94% range, 757 words of MT segments and 749 words in *no match* segments). As such, Guerberof Arenas' study differs from the typical MT-assisted TM environment in the same way as O'Brien (2007) and Guerberof Arenas (2009), i.e. in including *no matches*. The translators used a web-based tool to translate the text, and the MT engine employed was trained on TM material and three glossaries. As in Guerberof Arenas (2009), the translators could only see one segment at a time and did not know the origin of each segment. It was not possible for translators to return to previous segments or check their translations, and the glossary provided to the translators was not integrated in the CAT tool. During the assignment, translators worked from their home or office, i.e. in their typical environment. In terms of methods applied, the web-based tool measured the

time spent by each translator on each segment and can thus be classified as a type of limited keystroke logging, i.e. an online method in Krings' (2005) terms. Guerberof Arenas also used product analysis, a retrospective online questionnaire and retrospective interviews conducted via Skype.

The findings showed that the editing speed for MT matches was not statistically different from the editing speed for 85-94% TM matches. However, there were statistically significant differences between TM and MT matches and the *no match* category which suggests that the translation proposals helped translators increase their productivity.⁷ Hence, this result confirms the results of Guerberof Arenas (2009) which also showed an increase in speed when translators used TM or MT compared to translating from scratch, whereas the findings of the 2012 study contradict the pilot study in that no statistically significant difference was found between the editing speed for TM matches and the editing speed for MT matches. Also, contrary to the 2009 study, the 2012 study showed that there were no significant differences between the advantage fast and slow translators get from translation aids. Hence, Guerberof Arenas concluded that "no matter whether you are a slow or fast translator you will be equally benefited by MT or Fuzzy matches" (Guerberof Arenas 2012, p.104). Finally, contrary to the 2009 study, Guerberof Arenas (2012) found that there were no significant differences between experienced and less experienced translators in terms of editing speed.⁸

Guerberof Arenas' study is highly interesting as it is one of few studies to draw on data from such a large number of translators. Also, it is highly interesting that, in several respects, the findings of the main study (2012) contradict the findings of the pilot study (2009). The question is whether the main study, based on more data, provides the more correct picture, or whether the differences are, for example, caused by individual differences between translators. Guerberof Arenas herself stated that the two studies were quite different in terms of, for example, the number of translators and the TMs and MT engines used, and she hypothesized that the 2012 results were more accurate "due to the fact that the volume of words to translate and number of translators were higher and therefore it is closer to a real-life scenario" (2012, p.151). The points criticized in the description of Guerberof Arenas (2009) in this section also apply to this study: for example, the fact that translators could only see one segment at a time and were not allowed to return to segments. The latter was also mentioned by some of the translators during the retrospective interviews and thus seems to have impacted on ecological validity (Guerberof Arenas 2012, p.223). Moreover, it might have impacted on the results in that, as a consequence of the missing provenance information, the words requiring changes were not highlighted in TM matches, as they would normally be in CAT tools. Some translators noted this difference in the debriefings (Guerberof Arenas 2012, pp.223, 238) and this thus might have influenced TM productivity negatively. It is also relevant in terms of ecological validity that 14 of the participating translators expressed in the questionnaire that the web-based tool was "very different" or "different" from the tools they usually use (Guerberof Arenas 2012, p.209). Finally,

⁷ These results are also reported in Guerberof Arenas (2014a).

⁸ This analysis is also reported in Guerberof Arenas (2014b).

Guerberof Arenas (2012, p.71) noted that MT engines tend to work better with the English to Spanish language combination, and that it was thus not advisable to extrapolate directly any result to other language combinations.

Federico et al. (2012), as part of the MateCat project, compared TM translation and MT-assisted TM translation in an experiment with 12 professional translators. The experiment was conducted at the translators' usual workplaces and comprised two language directions (English-Italian and English-German) and two linguistic domains (information technology and legal). Each translator translated texts from one domain and in one language direction. All translators working within the same domain were assigned the same set of documents, half of which were translated only using TM while the other half were translated using MT-assisted TM. The CAT tool employed was SDL Trados Studio, which all the translators were familiar with. The authors extended SDL Trados Studio with a plug-in which provided the translator with the TM and MT matches, the MT matches coming from Google Translate. This plug-in was also the authors' primary method of data collection since it recorded the time spent editing each segment (opening and saving of each segment, the content of each source segment, the best ranking suggestion provided and the target segment). This method can be classified as an online method for observation of behaviour, in Krings' model (2005), more specifically as a type of keystroke logging, which is restricted to the collection of the mentioned information. The translators were asked to process segments as sequentially as possible, i.e. not to move to a new segment without having completed and saved the current one. This was important in order to ensure correct measurement of the time spent on each segment. Also, the translators were supposed to deliver a drafting of the target text, i.e. without checking their translations.

The authors measured editing speed in words processed in one hour. Before calculating the editing speeds, the authors removed the following data from their data set: overlapping segments (i.e. if translators did not follow the instruction to process segments sequentially), segments whose editing speed was more than 30 seconds per word or below 0.5 seconds per word (because these were assumed to be caused by interaction errors) and 100% matches. When calculated on the remaining data, the editing speed was higher for all translators when they were also provided with MT matches. For 10 out of 12 translators, the time gain when applying MT was statistically significant, with an average time gain of 27%. The slower translators obtained the largest relative gains in speed, while fast translators showed less improvement. Results also show that MT suggestions increased productivity more on medium (11-20 words) to long (> 20 words) segments rather than on short segments (1-10 words) which may be explained by the circumstance that the translators, for example, have to position the mouse on the word to correct every time and this has a larger relative impact on the time spent on short segments.

In terms of ecological validity, it was an advantage that translators were provided with full texts, rather than with isolated segments and that they were more or less free to work as they wanted. However, it is questionable whether asking them to work as sequentially as possible reflects the translators' normal working routine, a point also made by the authors themselves (Federico et al. 2012, p.9). The authors also note that the translators' different settings in the user interface and different habits in terms of, for example, the use of

keyboard shortcuts, might have impacted on the editing speed. However, arguably, this only reflects how translators work in real life and seems almost impossible (and undesirable?) to adjust for. Finally, as noted by the authors themselves, with their method, they were not able to detect whether a translator used information from external sources and whether a translator was effectively working on a segment or had stopped editing it, thus pointing to a problem inherent in the measurement of editing time as cognitive processes cannot be observed directly and we therefore do not know when translators are cognitively working with a segment and when they are not.

In their experiment, **Läubli et al. (2013)** compared two environments: a “TM-Only” condition where translators had access to a TM, a terminology database as well as any other translation aids of their choice, and a “Post-Edit” condition where MT matches were included in addition to the TM-Only setup. Thus, the Post-Edit condition was an instance of MT-assisted TM translation. The authors conducted an experiment with 6 translation students (BA or MA level) who each translated four marketing texts from the automobile industry from German into their native language, French; two in the TM-Only condition and two in the Post-Edit condition. The four source texts contained 50, 64, 103 and 107 words, respectively. Presumably, the experiment was conducted in a university setting, but this is unclear, as is whether translators were allowed to use their own computers. Läubli et al. argue that translators should be allowed to work in a realistic translation environment rather than in a specially tailored and unfamiliar user interface developed for the experiment, as has been the case in previous studies. They thus employed a customary translation workbench, namely Across Personal Edition. In the TM-Only condition, 100% matches had been preinserted into the target text, whereas all other segments were left empty. Fuzzy matches were shown in a “dedicated section of the workbench” (Läubli et al. 2013, p.84). In the Post-Edit condition, all segments, for which a 100% match had not been retrieved and preinserted into the target text, were translated by an MT engine, and this MT output was preinserted into the target text. Fuzzy matches were still available to translators in a dedicated section of the CAT tool. This is unusual compared to the typical MT-assisted TM setup where MT is only applied from a certain TM threshold, e.g. 70%.

The authors compared the two conditions in terms of translation time and quality. Translation time was measured through screen recording, an online method for observing translator behaviour (Krings 2005). Läubli et al. employed linear mixed effects models to account for translator and text differences and the results showed a significant reduction in translation time for the Post-Edit condition compared to the TM-Only condition. The integration of MT was shown to reduce translation time by 17.4%. Furthermore, the study showed that the more prose-like texts, consisting primarily of full sentences, were translated considerably faster than texts consisting primarily of bullet points and that the time reduction between the TM-Only and the Post-Edit conditions was most noticeable in the texts consisting of bullet points.

Läubli et al. stressed that they wished to use a realistic CAT tool and not “idiosyncratic user interfaces” (2013, p.85) which are not applied by translators in practice. However, the reason why other studies have applied such interfaces is most probably that they wanted precise measurements of translation time at a *segment* level. However, Läubli et al. only

measured time at *text* level, and this makes it considerably easier to let the translators work in a realistic environment. Finally, although they employed a realistic and customary CAT tool and the translators were familiar with translation technology, we do not know whether the translators actually knew *this* CAT tool, i.e. whether the environment was, strictly speaking, realistic for the translators in question. Arguably, it is not any more realistic to ask translators to work in a CAT tool that is publicly available that they do not know beforehand, than letting them work in another CAT tool specially developed for the experiment. However, in terms of ecological validity and in contrast with the studies applying such specially developed tools, it was important that in the CAT tool used by Läubli et al., the translators could see the segments in context.

Following the 2011 pilot study described above, **Teixeira** (2014b) was also interested in provenance information (here termed *metadata*). He was specifically interested in the impact of metadata on translation time, typing effort and error scores in an MT-assisted TM environment⁹ as well as in the translators' perceptions of working with and without metadata. Teixeira conducted an experiment with ten professional translators who were asked to translate a text in 1) a Visual setting where metadata were available and a text in 2) a Blind setting with no metadata. The ten translators were employed as in-house translators in a translation company and were native speakers of Spanish. The two source texts were excerpts from a troubleshooting guide for IBM software (containing 505 and 542 words, respectively) and were translated from English into Spanish. The translators had between 1.5 and 18 years of experience with translating IBM material and using IBM TranslationManager, the CAT tool used in the experiment. The two texts each contained 28 segments, evenly distributed between the following types of translation suggestions: 100% matches, 85-99% fuzzy matches, 70-84% fuzzy matches and MT matches. The experiment was conducted at the translators' workplace and translators thus worked on their own computers. Teixeira used three online methods to observe behaviour, namely screen recording (BB FlashBack), keystroke logging (Inputlog) and eye tracking (a Tobii X120 eye tracker). Due to different challenges related to the workplace setting, however, a quantitative analysis of the eye tracking data was not possible. Further, Teixeira applied two offline methods: product analysis and retrospective interviews to evaluate the quality of the target texts and to investigate the translators' perceptions of their performance, respectively.

Teixeira measured time in seconds spent per 100 source words, and his results showed that the presence of metadata affected translation time. More specifically, his study showed that on average, translators spent 43% more time on the Blind task than on the Visual task, suggesting that the presence of metadata allowed translators to work faster. The results also showed that the impact of metadata on translation time varied with the type of translation suggestion. The absence of metadata was responsible for a 265% and a 24% increase in translation time for 100% and 85-99% matches, respectively. According to Teixeira, this was to be expected since metadata help translators identify what does and does not need to be changed (Teixeira 2014b, p.151). This result also appeared to be in line with the findings

⁹ Some of the results published in the thesis are also published in Teixeira (2014a).

from the pilot study (Teixeira 2011) where the processing speed for 100% matches was reduced dramatically when metadata were not available. The presence or absence of metadata did not significantly affect the translation time for 70-84% and MT matches. In terms of the translators' perceptions, most translators thought they were faster in the Visual than in the Blind task and they generally preferred working in the Visual environment.

Teixeira's study is highly interesting as it was conducted in a workplace setting with professional translators who worked with a familiar CAT tool and with a familiar type of texts, and since the study investigated an important difference between TM systems and post-editing environments, namely the presence and absence of translation metadata. An important difference between the Visual and the Blind setting is, however, that in the Blind task, the matches were preinserted into the target text, whereas in the Visual setting they were not. This meant that in the Visual setting, in each segment, the translators had to insert actively the provided match in the target segment if they considered it to be a useful suggestion. Otherwise, they could type the translation from scratch or write on top of the source text. On the one hand, this difference might lead to increased time being spent on the Visual task, since translators had to spend time inserting the matches themselves (when they considered them useful), whereas in the Blind task, the matches were ready to be edited. On the other hand, if the translators were faster at translating from scratch than at editing matches, the difference would have the opposite effect. Teixeira (2014b, p.183) noted that it was not possible to isolate the impact of metadata on translation time from this difference in presentation mode.

3.4.2.2 Amount of editing

Another aspect of translators' interaction with MT-assisted TM which has been investigated and which is relevant to the current thesis is the amount of editing performed by translators in different types of matches. The amount of editing performed in a match is a manifestation of the technical effort involved in editing a match (Krings 2001, cf. Section 2.2) and has been approached in different ways: by measuring the number of keystrokes performed by translators and by measuring the difference between the provided matches and the target text using automatic evaluation metrics such as BLEU, GTM and TER (Koponen 2012).

Tatsumi (2010), in the part of her study where she compared editing of MT matches to editing of TM matches, measured the amount of editing performed on MT and TM matches by calculating the textual similarity between the match presented to the translator and the edited version by means of the GTM metric. The results showed that the amount of editing necessary for MT matches tended to be larger than the amount of editing needed for TM matches with match values above 75%. When comparing this to her results on speed, Tatsumi concluded that, although the amount of editing was larger for MT matches than for TM matches above 75%, the time taken to implement these changes was shorter for MT matches than for TM matches above 75%. This is highly interesting since there does not seem to be a direct connection between the time spent on matches and the amount of editing performed.

Guerberof Arenas (2012) also investigated the amount of editing implemented by the translators in the different segments, applying the so-called TER metric. Results showed that significantly more changes were made in the 85-94% TM matches than in the MT matches. Thus, although TM and MT matches were edited with similar speeds (cf. Section 3.4.2.1), the translators implemented significantly more changes in TM matches than in MT matches. Guerberof Arenas' findings contradict Tatsumi's findings which showed that translators edited more in MT matches than in TM matches above 75%. Guerberof Arenas (2012, p.105 ff.) argued that her findings reflected the fact that a number of MT segments were of such a quality that they could be accepted without changes, whereas fuzzy matches almost always required changes, also stating that the findings indicated that the quality of the MT output used in the experiment was high.

Federico et al. (2012) were also concerned with the amount of editing performed by translators. To calculate this, the authors used an edit-distance function that compared the match provided by the TM or MT engine with the final segment submitted by the translator, resulting in a number that reflected the similarity between the two. The authors interpreted the resulting so-called "similarity match" as an indication of the quality of the TM and MT matches. By subtracting the similarity match from 100%, the authors obtained the effort involved in editing the match. The results showed that the required effort decreased when translators were not only provided with TM matches, but also with MT matches, with decreases of 54.6% (English-German) and 78.5% (English-Italian) for the legal domain and 55.5% (English-German) and 74.2% (English-Italian) for the information technology domain. The authors noted that a decrease in effort is a natural consequence of doubling the sources for the matches, but at the same time stated that the extent of the decrease proved the effectiveness of the MT engine used in the test. They did not, however, explain how they measured this.

Teixeira (2014b) was interested in the impact of the presence of metadata on typing effort. Drawing on his keystroke logging data, Teixeira measured typing effort as the percent ratio between the number of keystrokes performed by the translator while editing a particular segment and the total number of characters in the resulting segment. Teixeira's study showed that the presence of metadata meant an overall increase in typing effort, i.e. the translators made more changes in the Visual than in the Blind mode. This result is interesting in relation to the difference in presentation mode between the Visual and the Blind task mentioned above (cf. Section 3.4.2.1) which might also intuitively lead to a higher typing effort in the Visual mode because here, the translators needed to actively insert the translation suggestion in the editing area and edit it or they could type the translation from scratch or on top of the source text, whereas in the Blind task, the suggestions had been pre-inserted and were ready to be edited. When related to suggestion types, the study showed that metadata reduced the typing effort for 100%, increased it for 85-99% and 70-84% matches and had no significant effect for MT matches.

3.4.2.3 Quality

Several studies have been concerned with measuring the quality of segments and/or texts translated by means of MT-assisted TM. Quality is an important aspect of translators' interaction with MT-assisted TM, since, for example, an increase in editing speed is not preferable per se if it is obtained to the detriment of translation quality. In this thesis, I do not measure the quality of translations produced by means of MT-assisted TM directly; however, the quality aspect is inherent in many of the research questions. For example, RQ1 approaches quality when investigating the extent to which translators accept the matches they are presented with, and RQ1a takes an interactional perspective of quality when it investigates the characteristics of the translators' interaction with the tool. Translation quality is also relevant in terms of, for example, RQ5, which looks into the amount of editing performed by translators in different matches, since the amount of editing is often taken to be inversely correlated with the quality of the provided matches. Although it does not attempt to measure the quality of the produced translations, RQ6 is also related to quality since it is concerned with the changes implemented during review of the translations. Therefore, it is relevant to look into what other studies have discovered about quality in relation to MT-assisted TM translation.

Guerberof Arenas (2009) hypothesized that the final quality of the target segments translated using MT was not different from the final quality of the target segments translated using 80-90% TM matches and the segments translated from scratch. This she investigated through a quality evaluation of the target segments. These were checked for errors following the LISA standard. Results showed that errors were present in all translators' texts and in both TM and MT matches and in segments translated from scratch. However, more than half of the total number of errors, 52%, were found in the TM segments, 27% were found in MT segments and 21% were found in segments translated from scratch. Guerberof Arenas suggested that the reason for the high number of errors in TM matches was that these matches flowed more naturally and that translators, therefore, did not question the text's correctness, whereas errors in MT matches were typically rather obvious. Thus, the hypothesis was not supported since the quality of edited MT matches was notably different than the quality of edited TM matches and also different than, although closer to, the quality of segments translated from scratch. Finally, Guerberof Arenas found that translators' technical experience did not seem to have an impact on translation quality.

Teixeira (2011) investigated the impact of the presence of provenance information on translation quality. Teixeira hypothesized that there was no significant difference in the quality level when provenance information was available compared to when it was not. In his study, quality was measured as a score given by two reviewers who assessed the quality of the four translations using a quality assessment grid and an error-count system. They were also told to score the translations holistically, i.e. on a scale from 0 to 10. Teixeira's data showed that the quality of the texts was on a comparable level, but he also noted that quality assessment was probably not done properly.

Skadiņš et al. (2011), in addition to investigating the impact of integrating MT into a TM environment on editing speed, also investigated the impact on translation quality. To

investigate the latter, a professional editor evaluated the quality of each translation according to the standard internal quality assessment procedure in the localization company in which the experiment was conducted. This resulted in an error score for each translation based on a weighing of errors. When evaluating the translations, the editor did not know which texts had been translated using the baseline or the MT scenario. Results showed that, while edited speed increased, the error score did the same for all translators. However, the authors concluded that, in spite of the increase in error scores, the translations still remained at an acceptable level of quality. Thus, they concluded that integrating MT into a TM environment could increase productivity within the domain of localization without a critical reduction in quality.

Guerberof Arenas (2012) also addressed the question of quality in translations produced using MT-assisted TM. She hypothesized that the final quality of the edited MT matches was higher than the final quality of the edited 85-94% TM matches and lower than the segments translated from scratch, which would be in line with the findings of her pilot study. She also hypothesized that translators with higher overall editing speeds would make fewer errors than those with lower speeds. Quality was measured by three professional reviewers and according to the LISA QA Model. The first hypothesis was not supported since the number of errors in the *no match* category was significantly higher than in the TM and MT categories and there were no significant differences between TM and MT matches.¹⁰ Thus, the 2012 study contradicted the results of the 2009 pilot study in this regard. The second hypothesis was not supported either as no statistically significant differences were found between fast and slow translators with regard to errors. Thus, Guerberof Arenas concluded, “it is not clear that spending more time on a translation might give better quality results, although this could be the case for certain translators” (Guerberof Arenas 2012, p.245). Finally, based on results from the pilot study, Guerberof Arenas also posed the hypothesis that the translators’ experience would not have an impact on the quality.¹¹ This hypothesis was not supported since the data showed that translators with more experience made significantly fewer mistakes than those with less experience. Thus, this result contradicted the findings of the pilot study.

Läubli et al. (2013), in addition to comparing translation times in a TM-Only and a Post-Edit condition, also evaluated the quality of the target texts produced in the two conditions by student translators. Two independent experts evaluated all translations as well as a reference translation produced by a professional translator without knowing the origin of the translations or the translation condition. When performing the quality evaluation, the evaluators were asked to score each translation on five parameters (target language expression, target language grammar, target language syntax, semantic accuracy, and translation strategy) on a scale from 1 to 4. Results showed that the quality of the texts translated in the Post-Edit condition was consistent with or, in some cases, better than texts translated in the TM-Only condition. Higher quality of texts produced in the Post-Edit condition than in the TM-Only condition was mostly found in texts containing fully formed

¹⁰ These results are also reported in Guerberof Arenas (2014a).

¹¹ The investigation of this hypothesis is also reported in Guerberof Arenas (2014b).

sentences as opposed to texts primarily consisting of bullet points. The authors also wanted to investigate whether the student translators preferred professional translations over translations produced in the study and therefore had them compare the translations of a selected number of segments. The analysis showed that the participating translators could not distinguish their translations produced in the Post-Edit condition from the reference translations, while they considered the reference translations to be better than the translations produced in the TM-Only condition. The findings of Läubli et al. are highly interesting. It is notable that the quality of translations produced by student translators using MT is consistent with or even better than professionally produced translations. However, as pointed out by the authors themselves, the translations might have been produced under very different conditions; for example, the professional translators might have been under time pressure when producing the translations. On the other hand, the quality of the translations produced by students might also have been negatively influenced by the fact that the translations were not meant to be sold to a client afterwards. Finally, it is not clear what CAT tools the professional translators employed, if any.

Teixeira (2014b), in addition to translation time, was also interested in the effect of the presence of metadata on error scores. He thus had two reviewers assess the translations produced in the experiment and calculated error scores as the number of errors per 100 source words. The analysis showed that the presence of metadata did not affect error scores, although most translators thought they made fewest errors in the Visual task.

3.4.2.4 Self-revision and review

Few studies have explored so-called self-revision and review in the context of the MT-assisted TM translation process. According to Mossop (2014, pp.187–188), self-revision entails both the translator's revision of his or her own translation in what I have termed the editing phase (referred to by Jakobsen (2002) as "online revision", cf. Section 3.2.1) and the revision done in what I refer to as the checking phase (referred to by Jakobsen as "end revision"). In fact, in several of the experiments conducted on MT-assisted TM, it was not possible for the participating translators to revise their own translations or the researcher(s) discouraged them from doing so, thus eliminating or limiting self-revision. Also, although some of the studies included quality evaluation (cf. Section 3.4.2.3) which may be said to reflect a similar identification of errors as the one conducted during review, none of the studies investigated review as a natural part of the translation workflow, but rather as part of the experimental setup where reviewers were asked to review many translations of the same text, counting and classifying errors according to a particular system (Skadiņš et al. 2011; Guerberof Arenas 2012; Läubli et al. 2013; Teixeira 2014b). In this section, I shall therefore concentrate on the studies which have explored self-revision in MT-assisted TM, understood as both revision during editing and during checking.

Tatsumi (2010) explored what she referred to as revisits, i.e. cases where the translators visited segments more than once. Tatsumi instructed the translators to avoid revisits as much as possible, but at the same time stressed that revisits were, in fact, possible. For example, Tatsumi's analyses showed that making more revisits does not necessarily make

one a slower translator, and that revisits generally took half the time of the first visit. She also found that the translators had very different revisiting behaviour, with some translators making revisits much more often than others. She also found that most of the translators made revisits within one minute of the previous visit or later on the same day, whereas the translators who made the most revisits made most of these on the next day. According to Tatsumi, this suggested that these translators did not make most of their revisits in order to make changes they already had in mind, but in order to revise the translation as a final step in their translation processes.

Teixeira (2011) measured the time the translators spent on different segments in both the editing and checking phases. However, he noted that, as mentioned above, in the checking phase it was particularly difficult to identify which segment the translators were focusing on at which time. Although Teixeira did not address it directly, it appears from his results that both of the translators spent time on checking all match types (Teixeira 2011, pp.113–115). Thus, his findings seem to suggest that translators perform checking of their translation independently of whether they are provided with provenance information or not.

In **Teixeira's (2014b)** study, it was possible for the translators to revise their translations. Teixeira did not provide a complete analysis of this aspect of the translation processes, but he included some illustrative and mainly qualitative examples of a handful of segments from his experiment. It appears from two of these examples that a number of translators visited the segments more than once (Teixeira 2014b, pp.132–142), as stated by Teixeira “usually in the proof-reading or self-revising phase at the end” (2014b, p.134). Although Teixeira did not provide a quantitative analysis of this aspect, he stated that the data “show many more iterations per segment in the Visual environment, as if the translators were first translating, then self-revising. In the Blind environment, which they considered to be revising or post-editing, they completed the task in a single round” (2014b, p.92). We recall that in the Visual environment, the matches had not been preinserted into the target text and translators therefore had to insert them themselves if they considered them useful, whereas in the Blind environment, the text was pretranslated. It is highly interesting if translators return to segments and revise them more often when they are provided with metadata and/or when segments are not pretranslated than when they are not provided with metadata and/or when segments are pretranslated.

Federico et al. (2012) specifically asked translators to hand in a “drafting” of the target text, i.e. without revising the translation in a checking phase. Further, they instructed the translators to process the segments as sequentially as possible, thus limiting the revisions the translators would potentially have liked to make during the editing phase. Federico et al. themselves stated that since the translators were not supposed to check their translations, they might have had different ideas of what was good enough to submit; some might have accepted MT matches without much editing because they considered these matches to be semantically correct, while others might have spent more time and made more changes because they felt they needed to deliver a target text of a higher quality. Also, interestingly, Federico et al. noted that in future research they would “try to cope with non-sequential translation patterns, which seem to be relatively frequent with some translators” (2012,

p.9), thus suggesting that translators using MT-assisted TM revised their translations during editing. **Läubli et al. (2013)** specifically argued that it was important in their experiment that the translators were not forced to “translate texts strictly segment by segment” (2013, p.88) and that “translated documents could be revised as a whole before submission” (2013, p.88). The authors stated that this was a possibility which the translators made extensive use of, but they did not provide further details on the translators’ behaviour in terms of self-revision. In **Guerberof Arenas (2009)** and **Guerberof Arenas (2012)**, the translators could only see one segment at a time and it was not possible for them to return to previous segments. Thus, Guerberof Arenas did not explore self-revision. **O’Brien (2007)** and **Skadiņš et al. (2011)** did not address the issue of revision.

3.4.3 Synthesis and research gaps

In this section, I shall synthesize the preceding literature review by relating the findings of the reviewed studies to the research questions of the current thesis, as well as point out emerging research gaps.

None of the reviewed studies specifically investigated the extent to which translators choose to accept, reject and revise matches in MT-assisted TM translation (**RQ1**) or the characteristics of translators’ interaction with the tool in relation to these choices (**RQ1a**). However, some of the studies touched on aspects relevant to these research questions. For example, in relation to her finding that significantly more changes were made in 85-94% TM matches than in MT matches, Guerberof Arenas (2012) argued that this reflected the fact that a number of MT segments were of such quality that they could be accepted without changes. Also, both O’Brien (2007), Guerberof Arenas (2009) and Guerberof Arenas (2012) showed that translators worked faster when editing TM and MT matches than when translating from scratch, indicating that it was more productive to revise matches than to reject them. In terms of translators’ interactions with the tool when accepting, rejecting or revising a match, Désilets et al. (2008; 2009) found that translators made use of many different resources and that, when encountering translation problems, they typically made use of corpus-based resources such as TMs. They also found that translators were very competent at scanning a list of potential solutions, and that they were critical when deciding on translation solutions. Karamanis et al. (2010; 2011) found that translators often accepted matches by using keyboard shortcuts, and that the concordance search was typically the first resource used when encountering a translation problem. Similar to Désilets et al., Karamanis et al. found that translation problems were thoroughly researched, especially when their solution involved online searches. Along the same lines as Désilets et al. and Karamanis et al., LeBlanc’s (2013; 2017) studies suggested that the TM is the primary resource for translators, with translators considering it to be a “one-stop shop” and with the TM becoming the sole tool used for decision-making. This perception of the TM was also reflected in Ehrensberger-Dow (2014) and Ehrensberger-Dow and Massey (2014) who found that even simple decisions were checked against the contents in TMs, for example. Further, they found that translators have many windows and tabs open during translation. Interestingly, Ehrensberger-Dow and Heeb (2016) found that the translator studied tended to ignore the suggestions provided by AutoSuggest, even in cases where the translator

ended up with a translation equal to the suggestion. Finally, Olohan's (2011) study showed that, in interacting with the CAT tool, translators experienced resistances which they had to accommodate.

All of the reviewed experimental studies investigated the time spent by translators on translating with an MT-assisted TM tool (**RQ2**). Some of the studies measured editing speed on a segment level and showed that MT matches were edited faster than TM matches with match values of 75% or more (O'Brien 2007; Guerberof Arenas 2009; Tatsumi 2010; Guerberof Arenas 2012). Other studies measured editing speed on a text level and showed that texts were translated faster when MT was added to a TM environment (Läubli et al. 2013; Skadiņš et al. 2011; Federico et al. 2012). Teixeira (2014b) showed that translators worked faster when they were provided with metadata in an MT-assisted TM environment than when they were not.

Most of the reviewed studies did not investigate whether translators process matches in a linear or non-linear manner in MT-assisted TM translation (**RQ3**), whether they perform checking of their translations or the nature of the changes implemented in this phase (**RQ4**). In fact, some of the studies did not give the translators the possibility of returning to previous segments (Guerberof Arenas 2009; Guerberof Arenas 2012) or instructed the translators to avoid doing so (Tatsumi 2010; Federico et al. 2012). However, Tatsumi (2010) investigated instances where translators "revisited" segments and found that making revisits did not necessarily make one a slower translator, and that a revisit generally took half the time of the first visit to a segment. Without specifically analyzing self-revision behaviour, a number of studies suggested that translators performed self-revision if they were given the possibility (Teixeira 2011; Federico et al. 2012; Läubli et al. 2013; Teixeira 2014b). In terms of self-revision, it is worth noting that not including self-revision in the analysis might influence the results on e.g. editing speed in the sense that if translators spend a considerable amount of time on self-revision and this is not taken into account, the productivity of the translators will appear higher than it actually is. For example, Moran, Lewis and Saam (2014) found that not letting translators check their own work leads to an overstatement of the utility of MT, at least compared to translation from scratch. Not taking self-revision into account might also impact on the amount of editing observed and the quality of the target segments. However, it seems that the choice of whether or not to include self-revision is often a trade-off between obtaining reliable data on time spent on each segment during editing and prioritizing ecological validity.

Some of the reviewed experimental studies focused on the amount of editing involved in MT-assisted TM translation (**RQ5**). These showed different results. Tatsumi (2010) for example found that the amount of editing needed in MT matches was larger than the editing needed in 75-79% TM matches, whereas Guerberof Arenas (2012) found that significantly more changes were made in 85-94% TM matches than in MT matches. Teixeira (2014b) found that the translators made more changes when they were provided with metadata than when they were not.

As mentioned above, the reviewed studies did not investigate review as a natural part of an MT-assisted TM translation process (**RQ6**). However, the results on quality are linked to this question, since errors found in quality evaluations of translations produced by means of MT-assisted TM are errors which might have been identified in a review phase. For example, Skadiņš et al. (2011) found that when MT is added to a TM environment, more errors are made, whereas Läubli et al. (2011) found that the quality of translations produced by means of MT-assisted TM was consistent with or higher than translations produced by means of TM alone. Guerberoof Arenas (2009) found that errors were evident in all translators' texts and in both TM and MT matches and in segments translated from scratch, and Guerberoof Arenas (2012) found that a similar number of errors were made in MT and TM matches. Bearing in mind that some of the errors might have been corrected if translators had been allowed to check their translations in Guerberoof Arenas' studies, the findings suggest that translations produced by means of MT-assisted TM should be reviewed.

Some of the reviewed studies provided findings on translators' attitudes to TCI (**RQ7**). For example, LeBlanc (2013; 2017) found that translators considered the sentence-by-sentence approach to be a disadvantage of TM systems, since it required them to work with segments instead of whole texts. LeBlanc also found that so-called "enforced recycling" limited translators' control over the target text and their decision-making authority and that TM implementation led to a loss of professional autonomy and a decline in professional satisfaction on the part of the translators. Ehrensberger-Dow (2014) and Ehrensberger-Dow and Massey (2014) also suggested that translation tools may limit translators' autonomy since even simple decisions are checked against e.g. TMs, and their study also showed that translators complained about limited space on their computer screens. Moreover, Olohan's (2011) study showed that the technology may pose resistances such as "forgetting" where something is stored, resistances which the translator has to accommodate in order for the interaction to progress. Finally, Karamanis et al. (2010; 2011) found that translators may have a black box perception of MT technology, not knowing why it acts as it does. A translator also indicated that the use of MT is risky, since MT matches may appear to be acceptable translations, although upon closer reading they are not.

In the above synthesis, a number of research gaps have been identified. These relate specifically to a lack of research delving systematically into *how* translators actually interact with an MT-assisted TM tool, for example in terms of their choices to accept, reject or revise the proposed matches and in terms of their interaction with the tool in relation to these choices. Also, the literature review demonstrated a lack of research into self-revision and review in an MT-assisted TM context. Further, the experimental studies of MT-assisted TM have generally not taken the context into account and several of them have involved translators working in ways that do not correspond to typical work practices, either by asking them to work with unfamiliar tools or by imposing unfamiliar requirements or limitations on the translators' ways of working. Finally, none of the reviewed studies dealt with Danish or even Scandinavian languages in the context of MT-assisted TM. Investigating the use of MT-assisted TM in the context of a smaller language like Danish is highly relevant when considering that SMT is data-driven and thus considered to perform better on language pairs for which large volumes of data are available than on language pairs involving

smaller languages. MT-assisted TM translation into Danish is also highly relevant in the context of the EU and the EU's multilingualism policy, with Danish being one of the 24 official EU languages. Based on its theoretical standpoint of viewing translation by means of MT-assisted TM as TCI and as a context-dependent activity, the current thesis aims to contribute to filling these gaps. It does so by means of an embedded mixed methods research design consisting in a workplace study in which a contextual study and, in turn, an experimental study is embedded, as will be explained in the next chapter.

Chapter 4

Methodology

Chapter 4. Methodology

In Chapter 3, TS was described as an interdisciplinary field that borrows theories and methods from other disciplines. Particularly with regard to TPR, we saw that a wide range of methods have been applied to study translation processes, and that methods are typically triangulated. Also, we saw that the field of HCI, like TPR, increasingly recognises that interaction with artefacts should be studied in the social context in which it takes place. The methodology of the current thesis, which is described in this chapter, is informed by these observations.

As suggested by Creswell (2014, p.5), I shall address the interconnection between the philosophical worldview guiding the study, the research design related to this worldview and the specific methods applied to address the research questions. I shall first introduce pragmatism as the worldview guiding the study. The pragmatic worldview is aligned with the thesis' focus on practice and on building the most suitable research design with which to answer the research questions. Then, I shall introduce mixed methods before describing the mixed methods design of this thesis as well as the specific methods employed to explore professional translators' interaction with an MT-assisted TM system and their attitudes to this interaction.

4.1 Pragmatism

Pragmatism emerged as a response to the “paradigm wars” between quantitative and qualitative research (Teddle & Tashakkori 2009, p.14; Feilzer 2010, p.6). It rejected the “incommensurability of paradigms” or “incompatibility thesis” advocated by quantitative or qualitative researchers who adhered to positivist/postpositivist and constructivist/interpretivist paradigms respectively and proposed that quantitative and qualitative methods could and should not be combined (Morgan 2007, p.58).

Up to the late 1970s, quantitative research and the associated positivist paradigm dominated the social sciences (Onwuegbuzie & Leech 2005, pp.269–270; Morgan 2007, p.56; Teddle & Tashakkori 2009, pp.5–6). Simply put, this type of research focuses on the gathering, analysis and interpretation of numerical information in order to describe and explore a phenomenon of interest or look for significant differences between groups or variables (Teddle & Tashakkori 2009, p.5 ff.). In the latter part of the 20th century, positivism was challenged and criticized by qualitatively oriented researchers who subscribed to the worldview known as constructivism (Teddle & Tashakkori 2009, p.6), a period referred to by Morgan as the rise of the “metaphysical paradigm” (Morgan 2007). Qualitative research is concerned with the gathering, analysis and interpretation of narrative information (Teddle & Tashakkori 2009, p.6). According to Morgan (2007), the metaphysical paradigm relied on the notion of the incommensurability of paradigms, i.e. that different assumptions about the nature of reality and truth on an ontological level meant that paradigms were incompatible, and meant furthermore that paradigms were also

incompatible on epistemological, methodological and method levels. From this viewpoint, paradigms thus determined methods in a top-down and unilateral manner in the sense that a specific ontological standpoint necessarily leads to certain epistemological and methodological assumptions and choice of methods (Howe 1988, p.10; Morgan 2007, p.62), as illustrated by Jensen (2013, p.58) in Figure 4.

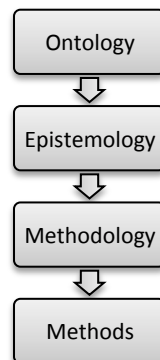


Figure 4. Top-down approach in the metaphysical paradigm (based on Jensen 2013, p.58)

Pragmatists rejected this top-down approach and the resulting polarization of qualitative and quantitative research, contending that methodological pluralism should be embraced (Onwuegbuzie & Leech 2005, p.272). For pragmatists, “research objectives drive studies, not the paradigm or method” (Onwuegbuzie & Leech 2005, p.278), and pragmatism thus takes a bottom-up approach, letting the research problems determine which methods are appropriate. Thus, Tashakkori and Teddlie define pragmatism as:

“a deconstructive paradigm that debunks concepts such as “truth” and “reality” and focuses instead on “what works” as the truth regarding the research questions under investigation. Pragmatism rejects the either/or choices associated with the paradigm wars, advocates for the use of mixed methods in research, and acknowledges that the values of the researcher play a large role in interpretation of the results” (Tashakkori & Teddlie 2003, p.713).

Feilzer even states that “[p]ragmatists do not “care” which methods they use as long as the methods chosen have the potential of answering what it is one wants to know” (2010, p.14). For this reason, Jensen (2013, p.59) places the research interest in the central position in pragmatism in Figure 5.

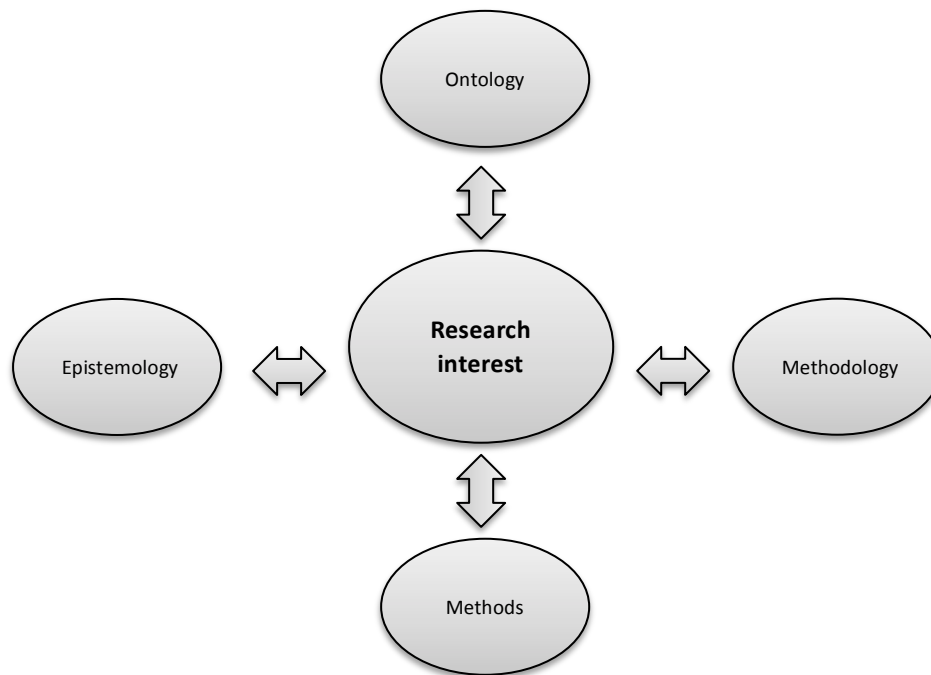


Figure 5. The central role of the research interest in pragmatism (based on Jensen 2013, p.59)

The central position of the research interest is also reflected in Howe's "Compatibility Thesis", which asserts that combining quantitative and qualitative methods is a good thing, and that there should be no forced choice between paradigms or methods. As stated by Creswell, "[i]nstead of focusing on methods, researchers emphasize the research problem and use all approaches available to understand the problem" (2014, p.10).

4.2 Mixed methods research

Pragmatism is the primary philosophical orientation associated with mixed methods research (Teddle & Tashakkori 2011, p.296). It provides justification for mixing quantitative and qualitative methods and modes of analysis (Morgan 2007, p.70; Feilzer 2010, p.6). Mixed methods research emerged in the late 1980s and has been defined in the following way (where QUAL is short for qualitative and QUAN for quantitative): "a type of research design in which QUAL and QUAN approaches are used in type of questions, research methods, data collection and analysis procedures, and/or inferences" (Tashakkori & Teddlie 2003, p.711). As Creswell states, "[t]he core assumption of this form of inquiry is that the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone" (2014, p.4). Many different terms have been used to refer to this approach; however, *mixed methods* is the term typically used (Creswell 2014, p.217). Mixed methods research has also been called the "third research community", since it arose in response to its "older cousins", quantitative and qualitative research (Teddle & Tashakkori 2009, p.4).

As indicated in the above definition, the integration of quantitative and qualitative aspects is at the core of mixed methods. Thus, in mixed methods studies, research questions are

answered with information that is both narrative and numerical in nature, and researchers alternate seamlessly between quantitative and qualitative analyses (Teddle & Tashakkori 2009, p.8). According to Creswell and Plano Clark (2011, pp.63–68), there are four central aspects to consider when designing a mixed methods study. With a strand being “a component of a study that encompasses the basic process of conducting quantitative or qualitative research” (Creswell & Plano Clark 2011, p.63), these aspects concern 1) the level of interaction between the qualitative and quantitative strands of the study, 2) the priority of the qualitative and quantitative strands, 3) the timing of the qualitative and quantitative strands, and 4) procedures for mixing the qualitative and quantitative strands. The *level of interaction* refers to whether the qualitative and quantitative strands are kept independent of each other or whether they are interactive. If they are independent of each other, qualitative and quantitative research questions, data collection and data analysis are kept separate until the final interpretation of the study findings. If they interact, the two strands are combined before the interpretation. The *priority of the quantitative and qualitative strands* refers to weighting of the quantitative and qualitative strands: they may be given equal priority; alternatively, either the quantitative or the qualitative strand may be given priority. The *timing of the qualitative and quantitative strand* refers to the point(s) in the research process where the quantitative and qualitative strands of a study are implemented: e.g., they may be implemented sequentially in the sense that one type of data is collected and analysed before another type of data is collected and analysed; otherwise, they may be implemented concurrently, where the two types of data are collected and analysed at the same time. Finally, *procedures for mixing the qualitative and quantitative strands* refers to the stage of integrating the qualitative and quantitative strands and how this integration is carried out. Integration may occur at one or more of the different stages of a research process: interpretation, data analysis, data collection and design. For example, at the data analysis stage, the researcher may integrate the two forms of data through *data conversion* by means of which qualitative data are quantitized (converting qualitative data into numbers) and/or quantitative data are qualitized (converting quantitative data into narratives) (Onwuegbuzie & Leech 2005, p.287; Teddle & Tashakkori 2009, p.27; Saldanha & O’Brien 2013, p.203). At the design level, they may e.g. be integrated if the researcher embeds quantitative and qualitative methods within a design typically associated with one of the methods, such as if both quantitative and qualitative methods are used within an experiment which is typically quantitative in nature.

Different typologies of mixed methods designs have been developed (cf. Creswell & Plano Clark 2011, pp.56–59), but in the mixed methods literature it is stressed that each researcher should create the research design that best meets the needs of the particular study in line with the pragmatic approach to research (Creswell et al. 2003, p.223; Teddle & Tashakkori 2009, p.139; Creswell & Plano Clark 2011, p.60).

4.2.1 Pragmatism and mixed methods in Translation Studies

It seems that many researchers in TS take a pragmatic approach to research (Jensen 2013, pp.59–60). For example, Saldanha and O’Brien state that “[t]he approach to take to one’s research should be determined by the research question(s) and how best it/they might be

addressed” (2013, p.22), reflecting that, as argued in the pragmatist tradition, research question(s) should drive a study. Also, Wilss (2004, p.780) argues that TS has moved from top-down to bottom-up research, suggesting that TS researchers now often take their starting point in research problems. The apparently prevailing pragmatic approach also seems to be reflected implicitly in the acknowledgment of the combination of qualitative and quantitative methods in TS. For example, Hansen argues that “[i]n TS, quantitative and qualitative methods can be used in a variety of combinations and triangulations. There is no universally “best way” of combining methods” (2005b) which is very much in keeping with the basic assumptions of pragmatism and mixed methods.

In the subfield of TPR, mixing methods is also generally encouraged. In fact, the fruitfulness of combining quantitative and qualitative data from a translation process can be considered to be central to TPR, with Jakobsen including the “multimethod-stronger-hypothesis assumption” in his three basic assumptions underlying TPR (Jakobsen 2014, pp.75–76, cf. also Section 3.2). Along similar lines, Munday argues that TPR is “one of the most exciting and rapidly developing areas in translation studies, particularly in the use of mixed empirical methods” (2016, p.104). Also, Muñoz Martín (2014, pp.69–72) argues that combining quantitative and qualitative methods is a natural consequence of the recognition that translation is a context-dependent activity; he states that “[t]he question is not whether one method is better than the other, but whether they do justice to a particular research aim” (Muñoz Martín 2014, p.71). Thus, although researchers within TPR do not typically state that they adhere to a pragmatist worldview, it seems to be an accepted and preferred approach to conducting process research.

4.3 Mixed methods research design of this thesis

This thesis employs a so-called embedded mixed methods design (Creswell & Plano Clark 2011; Creswell 2014). It is embedded in two senses. Firstly, a contextual study is embedded within a workplace study; secondly, an experimental study is embedded within a contextual study which in turn is embedded within a workplace study (cf. Figure 6). The contextual study uses qualitative methods (observation, semi-structured interviews and document collection). The experimental study uses a combination of qualitative and quantitative methods: in the MT-assisted TM translation part, the methods screen recording, keystroke logging and observation are used while the translators are translating (online methods in Krings’ (2005) terms), and retrospective interviews and post-experimental questionnaires are used after the translation process is completed (offline methods), and in the review part, the reviewers review one translation produced in the MT-assisted TM translation part by another translator and self-report the time spent on the review task.¹²

¹² In line with the broader definitions of the translation process as mentioned in Chapter 3, I regard review to be a part of the translation process. Thus, the division into “MT-assisted TM translation” and “review” in the illustration of the research design of the thesis should not be taken to imply the opposite; it merely serves to illustrate the different components of the experimental study as it was conducted at TextMinded.

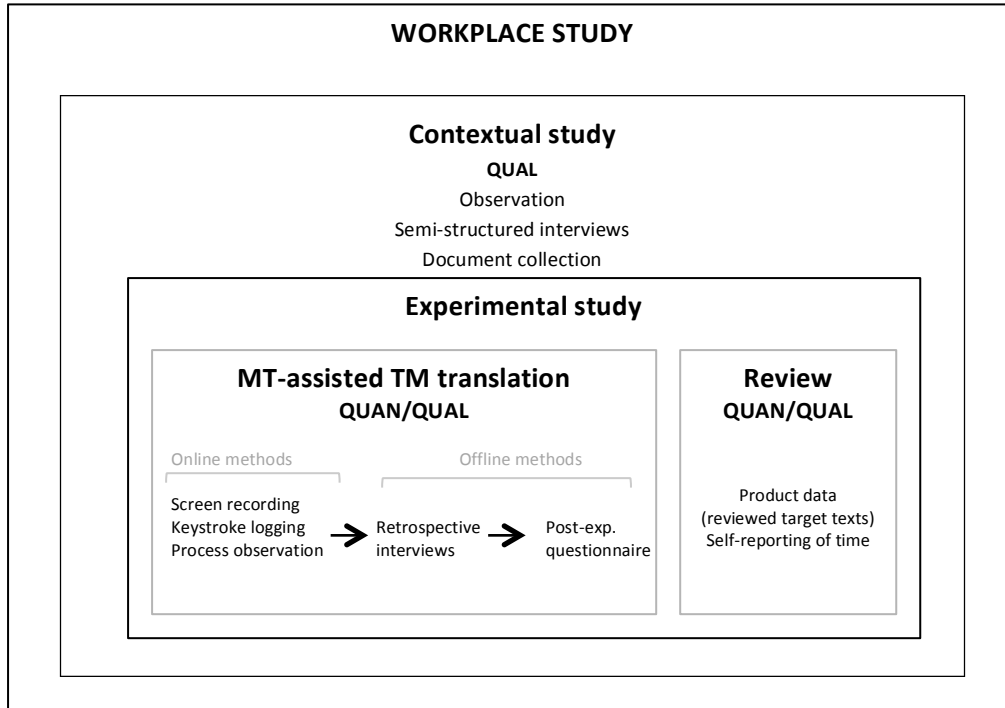


Figure 6. Embedded mixed methods design of this thesis

The current study is conducted as a workplace study, a type of study originating from HCI as a result of the field's "turn towards the social" (Luff et al. 2000), which involves an acknowledgement of the context in which artefacts are used, as described in Section 3.2.3. Workplace studies are characterised by being concerned with the contingent and situated character of practical organizational conduct. Such studies take artefact-mediated conduct as their primary interest; they are undertaken in the setting in which the activity that is investigated normally occurs (Luff et al. 2000). These aspects are also characteristic of the current thesis which regards TCI as a context-dependent process and which has translators' interaction with an MT-assisted TM tool as its central object of study. Workplace studies involve extensive fieldwork and may, like the current thesis, be concerned both with naturally occurring workplace activities and/or involve quasi-naturalistic experiments in the workplace setting (Luff et al. 2000). Some workplace studies are concerned with the design and redesign of technologies. The primary goal of the present study is not to contribute to the (re)design of MT-assisted TM tools, but exploring how the translators interact with the tool might reveal aspects relevant to developers of CAT technology. As such, design recommendations might be an additional outcome of the analysis.

In mixed methods terms, the qualitative and quantitative parts of the study are interactive in that the methods are mixed prior to interpretation of the findings. The quantitative and qualitative parts of the study are integrated at both the design, data collection, data analysis and interpretation stages of the research process. In terms of the design, they are integrated both in the sense that quantitative and qualitative methods are embedded in an experimental study which is typically quantitative in nature, and in the sense that the experimental study is embedded in a contextual study using qualitative methods and a workplace study which is also typically qualitative in nature. With respect to data collection,

qualitative and quantitative methods are used concurrently, and in terms of data analysis, data conversion is employed (cf. Section 4.2). Also, in the interpretation stage of the research process, quantitative and qualitative parts are integrated. This leads to roughly equal priority being given to the quantitative and qualitative parts of the study.

In what follows, I shall first briefly introduce the workplace study and TextMinded, the LSP in which the workplace study was conducted. Then, I shall describe the contextual study, including the methods used, and reflect on my role as a researcher at TextMinded during the workplace study. Next, the experimental study will be described, including the methods used and the data obtained. In Section 4.3.2, I shall comment on the methods employed for data analysis, and finally, in Section 4.3.3, I describe some ethical considerations related to the study.

4.3.1 The workplace study at TextMinded Danmark A/S

At the time of data collection, TextMinded was the second largest LSP in Denmark, measured by turnover. TextMinded is the result of a merger between *Oversætterhuset* (Translation House), based in Aarhus, and *EICOM*, based in Vejle. The two companies merged on 1. February 2012. TextMinded employs more than 50 people in its three Danish offices in the cities of Aarhus, Vejle and Copenhagen and in its three international offices in Chile, New Zealand and China. The office in Aarhus is the main office. TextMinded's key service is translation (amounting to 85-90% of the services at the time of data collection); besides this, the LSP also provides e.g. copywriting, terminology services and desktop publishing (DTP) services to clients. Its clients range from private individuals to small and medium-sized companies to large multinational companies and public sector companies. At the time of data collection, TextMinded employed eleven in-house translators in the Aarhus office. Apart from in-house translators, TextMinded also draws on a large network of freelance translators. As a limited number of in-house translators cover a limited number of languages (primarily Danish, English and German), most of the translation tasks are performed by external translators.

At the Aarhus office, eight of the 11 in-house translators are seated in a large, open-plan office. Two of the remaining three translators are seated in a shared office, and the last translator has her own office. The three last-mentioned translators are also partners at TextMinded. Five project managers share a large office, and two key account managers with special responsibility for distribution of tasks between internal and external translators share an office. Finally, TextMinded's two managers share an office. Apart from these offices, there is a meeting room and a lunch room.

As part of the workplace study, I spent four weeks at the Aarhus office: one week in February/March 2013 and three weeks in May/June 2013. In the third of these four weeks, the MT-assisted TM translation part of the experimental study was conducted. The workplace study further comprised two one-day visits to TextMinded's office in Vejle, Denmark, in May and June 2013. Also, the review part conducted in August 2013 as part of the experimental study is regarded as a part of the workplace study.

The employees at TextMinded were informed about the company's participation in the project in an e-mail from one of the partners at TextMinded in May 2012, and the project was again briefly mentioned at an employee meeting in February 2013. On 19 February 2013, I sent out an e-mail to all employees where I briefly mentioned my interest in CAT and told them that I would be visiting them for a week at the end of February/beginning of March 2013 and again in May 2013, and that other than that, they might see me dropping in from time to time. Finally, I emphasized that everything that they might tell me during my stay would be anonymized.

4.3.1.1 The contextual study

The contextual study was conducted as fieldwork in TextMinded's main office in Aarhus, the office at which all of TextMinded's in-house translators are employed. In what follows, the methods used for data collection are described.

4.3.1.1.1 Methods for data collection

In the contextual study, I used observation, semi-structured interviews and document collection. In the data collection, I was interested in the use of CAT tools, including the implementation of MT, and in understanding the workflow at TextMinded, but apart from these aspects, the data collection was quite open-ended. It should be noted already at this point that the data collected during the contextual study primarily serve to frame my understanding of the findings of the experimental study. The data generated as part of the contextual study were thus collected based on the understanding of the MT-assisted TM translation process as a context-dependent TCI process, a process that I did not feel that I would understand without having studied the context in which it unfolded (cf. Ehrensberger-Dow 2014, pp.366–367). For instance, the data are brought into play as a contextualization of the experimental study in the beginning of Chapter 5, and I will draw on the data in the analyses addressing the different research questions, where relevant.

4.3.1.1.1.1 Observation

Daymon and Holloway define observation as “the systematic noting and recording of events, artefacts and behaviours of informants as they occur in specific situations rather than as they are later remembered, recounted and generalized by the participants themselves” (2011, p.258). Observation is often used in ethnographic studies, but may also serve as a qualitative method in its own right (Daymon & Holloway 2011, p.258), as is the case in the current thesis. According to Saldanha and O'Brien, “[o]bservation is a rather neglected tool in translation studies, but one worth being aware of” (2013, p.222).

Gold (1958) identified four observer roles which researchers may take and which are useful in relation to the extent of participation and observation. These roles are situated on a continuum from complete participant to complete observer. The complete participant takes an “undercover” role; s/he takes part in the work at the research site, and the people whom

s/he observes do not know that they are being observed. The complete observer, on the other hand, only observes and does not interact with the people being observed. In between these two roles are the participant-as-observer and the observer-as-participant. The participant-as-observer takes part in the work in the research setting to some extent, and the people in the setting acknowledge the researcher's presence as a participant who also observes (Daymon & Holloway 2011, p.264). The observer-as-participant is closer to the role of complete observer in that the researcher does not take part in the activities in the research setting, but contrary to the complete observer, the observer-as-participant can ask questions, "being accepted as a researcher but not called upon to play a role as a member of the workforce" (Daymon & Holloway 2011, p.266). According to Daymon and Holloway (2011, p.267), an observer-as-participant may e.g. follow a person through their daily work, questioning the person along the way.

In the current thesis, my role can be characterized as alternating between participant-as-observer, observer-as-participant and complete observer, leaning towards observer-as-participant. I participated in some activities, such as two webinars on MT and post-editing, together with some of the employees at TextMinded, and I was a part of the regular workday in the sense that I drank coffee and had lunch with the employees, participating in everyday conversations. I made observations in different parts of TextMinded: in the open-plan offices where most of the translators worked, in the office which two of the other translators shared, in the project managers' office and in the office of the two key account managers who were responsible for the distribution of tasks between translators. Sometimes, I observed what was going on without interacting with the participants, but most often I asked questions. Sometimes, I did not even have to ask questions: the employees spontaneously started telling me about their work while performing it. This was particularly the case with the project managers, who were very informative about their work processes. This was an advantage, since I assume that, in line with the experience of Risku et al. (2013, p.43), it would have been difficult to follow their fast "clicking" in e.g. e-mails, source texts, the project management system and CAT tools had it not been accompanied by some explanation. In the last week of the contextual study, i.e. after the experiment had been conducted, I specifically wanted to follow the genesis of translation tasks to gain more insight into workflows at TextMinded. I therefore followed several translation tasks from when they were received and prepared by the project manager, sent to the translator and the reviewer, back to the translator (in accordance with the *tandem translation* workflow, cf. Section 5.1.2) and then on to the project manager who completed and delivered the target text to the client. I observed each actor's work with the task and made field notes. As noted by Koskinen (2008, p.45), in a workplace setting, events take place synchronously, with the consequence that the researcher cannot observe everything. This meant that at a few points, I did not manage to observe all steps of the process, because I was making observations elsewhere; however, I still gained considerable insight into the typical workflow and "making-of" translations (Risku, Windhager, et al. 2013, p.169). As stated by Ehrensberger-Dow, this process allowed "a realistic picture of professional translation and

revision” to emerge (2014, p.362).¹³ Throughout the contextual study, I made field notes. In these, I described my observations, always together with the date, time and place of my observations. Also, I made note of reflections regarding my role as researcher (cf. Section 4.3.1.1.2). Most of the field notes were made by hand in a notebook, while others were made on my computer when this seemed more appropriate. As pointed out by Saldanha and O’Brien (2013, p.222), one of the main problems involved in observation is the Hawthorne effect which I shall comment on in Section 4.3.2.1.

4.3.1.1.1.2 Semi-structured interviews

Apart from observing everyday activities, semi-structured interviews were conducted with a handful of people from TextMinded: two members of management, who were particularly involved in the implementation of MT, a project manager who was also a QA manager and two key account managers. One of the key account managers was the key account manager for Bang & Olufsen, the client whose source texts were used in the experiment (cf. Section 4.3.1.1.3.1.3), as well as QA manager, and the other worked for a large client who was in the process of integrating MT in a crowdsourcing project. These individuals were asked to participate in an interview, since they were expected to be able to provide information about CAT, including the implementation of MT and about the workflow. Prior to each interview, an interview protocol (Creswell 2014, p.194) was created which included a limited number of questions meant to guide the interview. These questions were quite open-ended and primarily revolved around CAT and around TextMinded’s typical workflow.

4.3.1.1.1.3 Document collection

Finally, I collected documents during the contextual study which were relevant for understanding the translators’ context. For instance, documents related to TextMinded’s workflows were collected, as were a number of style guides. In particular, two style guides that related to the translation of texts from Bang & Olufsen were collected since these might cast light on some of the translators’ decisions in the experimental study.

4.3.1.1.2 The researcher’s role

Qualitative research generally requires the researcher to reflect on how his or her previous experiences shape the observations and interpretations made during a study (Saldanha & O’Brien 2013, p.30; Creswell 2014, p.187ff.). According to Koskinen, demonstrating such self-reflexivity becomes even more important when the researcher has professional experience with the studied activity: “analysing a familiar professional activity requires an extra dose of self-reflexivity” (2008, p.9). This applies to the current thesis, since I am educated as a translator and have practical experience of translation using CAT tools.

¹³ It should be noted that the translation tasks which I was able to follow were ones which were solved internally, i.e. translated and reviewed by in-house translators, were translated into one language and did not include DTP work. Many other tasks were regularly outsourced to freelance translators, translated into many different languages and went through several rounds of DTP. For practical reasons, I was not able to follow these.

Creswell (2014, p.188) suggests that the researcher comments on e.g. previous experiences with the research problem, the participants or the research setting, and that this may include past educational and work experiences and different demographic factors. Although I had much less practical translation experience than the studied translators, the fact that I am a translator myself is an important aspect since it provided a common frame of reference. According to Hubscher-Davidson, in relation to TPR in particular, this is an advantage since “participants would arguably feel more comfortable discussing or commenting on an activity that the researcher has also undertaken” (2011, p.11). Also, some of the translators had completed their education as translators at the same educational institution I attended for my PhD. This meant that some of them knew some of my colleagues. Furthermore, I studied with one of the translators, and we still see each other from time to time in a group of previous classmates. Also, some of the employees might have recalled me being a freelance translator at *Oversætterhuset* during a short period in 2007 although this was never brought up. Apart from that, I had the feeling that the fact that I was younger than many of the employees put me in a more “innocent” position in the sense that the employees did not feel that they had to prove anything to me. However, coming from an academic institution might have worked in the opposite direction in the sense that they might have thought that I evaluated their performance according to ideal academic standards. Further, as suggested by Koskinen (2008, p.9) and Ten Have (2004, p.132), I felt a certain degree of split loyalty to the employees, on the one hand, and to my academic task, on the other. Although I did not feel that I found anything particularly compromising in the study, during the data collection I did have a feeling that I would be disloyal if I had to report negative aspects, since I got to know them all a bit, and they were all very friendly. Finally, I wondered whether the employees took me to be an advocate of MT, although I had a fairly neutral attitude to MT and was basically just genuinely interested in how the translators interacted with the tool and how the MT engine performed. Thus, I was quite conscious of the way in which I spoke about MT.

The aspects mentioned in this section are aspects which influenced my role as a researcher. In the field notes, I noted reflections with regard to my researcher role when I felt that such aspects were at play. In this way, I strove to be actively self-aware and conscious about my engagement at TextMinded. Although, as mentioned above, the data collected during the contextual study primarily served to frame my understanding of the findings of the experimental study, I hope that this reflexivity has benefited my interpretation of the collected data.

4.3.1.1.3 The experimental study

In order to explore translators’ interaction with an MT-assisted TM system and their attitudes to this interaction, an experiment was conducted at TextMinded. This experiment consisted of an MT-assisted TM translation part conducted in May 2013, where eight translators were asked to translate the same two source texts, and a review part in August 2013, where each translator reviewed one of their colleagues’ texts. The MT-assisted TM

translation part is described in Section 4.3.1.1.3.1, and the review part is described in Section 4.3.1.1.3.2.

Exploring translators' interaction with MT-assisted TM in a way that allows for comparisons across match types, translators and texts and at the same time acknowledges that translation is a context-dependent activity and should thus be investigated in a workplace setting is – admittedly – something of a balancing act. As pointed out by Ehrensberger-Dow and Massey, departing from the viewpoint that workplace studies focus on authentic translation assignments, “[o]ne of the broader challenges of workplace TPR is how comparisons can be made when so many factors differ (e.g. source texts, language combinations, settings, use of translation memory)” (2015, pp.11–12), concluding that workplace researchers cannot count on being able to make comparisons. However, the question is whether opting for comparability by means of an experimental design is incompatible with a workplace study and the view of translation as a context-dependent activity? Or, as stated by Risku et al., “[w]here, exactly, do we draw the line between the need to reduce the research object’s complexity for operationalization and empirical investigation and the loss of ecological validity and relevance?” (2013, p.167). In the present thesis, I have sought to strike a balance between ecological validity and allowing the findings to be comparable. I have done this by conducting an experiment, at the same time as insisting on the translators being permitted to work in a way that resembles their typical work situations as much as possible. Thus, I follow the suggestions by Christensen (2011, p.156) and Göpferich (2008, pp.14–16) regarding conducting an experimental field study with a high degree of ecological validity.

It should be noted that the experiment might be more accurately described as a quasi-experiment, a field experiment or an experimental field study (Oates 2006, pp.133–134; Christensen 2011, p.156; Gile 2016, pp.225–226; Mellinger & Hanson 2017, pp.7–8), since it was conducted in a natural, workplace setting (and not in a laboratory) in which all variables cannot be controlled. Recognizing that the distinction between an experiment and a quasi-experiment is not clear-cut, according to Mellinger and Hanson (2017, pp.7–8) and Gile (2016, p.225), many studies in TS fall into this category. I shall continue to refer to the conducted study as an experiment, keeping in mind that it is not an experiment in the strictest quantitative terms.

4.3.1.1.3.1 The Machine Translation-assisted Translation Memory translation part

The MT-assisted TM translation part of the experimental study took place during a week in May 2013. In the following, the translators participating in the experiment, the MT-assisted TM tool they used and the two source texts they were asked to translate are introduced. Then, the steps in the execution of the experiment are described, and methods for data collection used in the individual steps are also included.

4.3.1.1.3.1.1 The translators

During the preparatory meetings and discussions between the management at TextMinded and me, it was agreed that, from a research, practicality and cost point of view, it was appropriate to engage eight translators in the experiment. The eight translators were selected in cooperation with a key account manager at TextMinded with special responsibility for the distribution of internal resources. Three of TextMinded's 11 in-house translators were not included in the experiment: since it was a prerequisite for inclusion in the experiment that the translators had experience of the CAT tool to be used and two of the 11 translators had not, these were not included. According to the key account manager, the last translator was left out by coincidence. This can be characterised as a purposive sampling technique as subjects who could provide particularly valuable information about the research questions were selected. Purposive sampling is common in mixed methods studies, and studies employing purposive sampling focus on an in-depth exploration of a limited number of cases rather than including a large sample (Kemper et al. 2003, p.279; Teddlie & Tashakkori 2009, p.25). This is aligned with the thesis' purpose of exploring TCI in depth and from several perspectives.

Prior to the experiment, I sent an e-mail to the eight translators, asking them whether they would like to participate. In this e-mail, they were also asked whether they had specific preferences concerning eight time slots suggested for the experiment. Admittedly, this combination of asking them whether they would participate and the planning aspect might have made it a bit difficult for them to refuse to participate. However, at no point did I sense any resistance towards participating, rather the contrary. I received positive responses from all translators.

The eight translators were all experienced translators. They all had Danish as their native language, and to varying degrees, all translators were used to translating from English into Danish. As is visible from Table 1, five of the translators were women and three were men (randomly named with a letter from A to H). Their experience with professional translation ranged from 6.5 to 23 years (the exact number of years is not given in Table 1 for reasons of anonymity). The translators did not receive compensation for their participation since they were employees at TextMinded; TextMinded bore the costs of the experiment in terms of the time spent. The translators will be further introduced in Section 5.1.3.

Translator	Gender	Professional translation experience (years)
A	F	20-25
B	M	11-20
C	F	5-10
D	F	20-25
E	F	5-10
F	M	11-20
G	M	11-20
H	F	11-20

Table 1. The translators

4.3.1.1.3.1.2 The Machine Translation-assisted Translation Memory tool

The MT-assisted TM tool used in the experiment was the CAT tool SDL Trados Studio 2011 which at the time was the CAT tool primarily used at TextMinded. The TM applied was TextMinded's client-specific TM for Bang & Olufsen for the language pair English-Danish. The TM was used to pretranslate the source texts with matches with match values down to 70%. Source segments with matches below 70% were pretranslated using an MT engine. The MT system was SDL's baseline MT engine, SDL BeGlobal Enterprise. TextMinded had trained the baseline engine with all of their TM data on the language pair English-Danish and with their client-specific termbase for Bang & Olufsen. After translating the two source texts by means of the TM and the MT engine, we had two pretranslated source texts which were to be edited by the translators, producing two target texts. The process is illustrated in Figure 7.

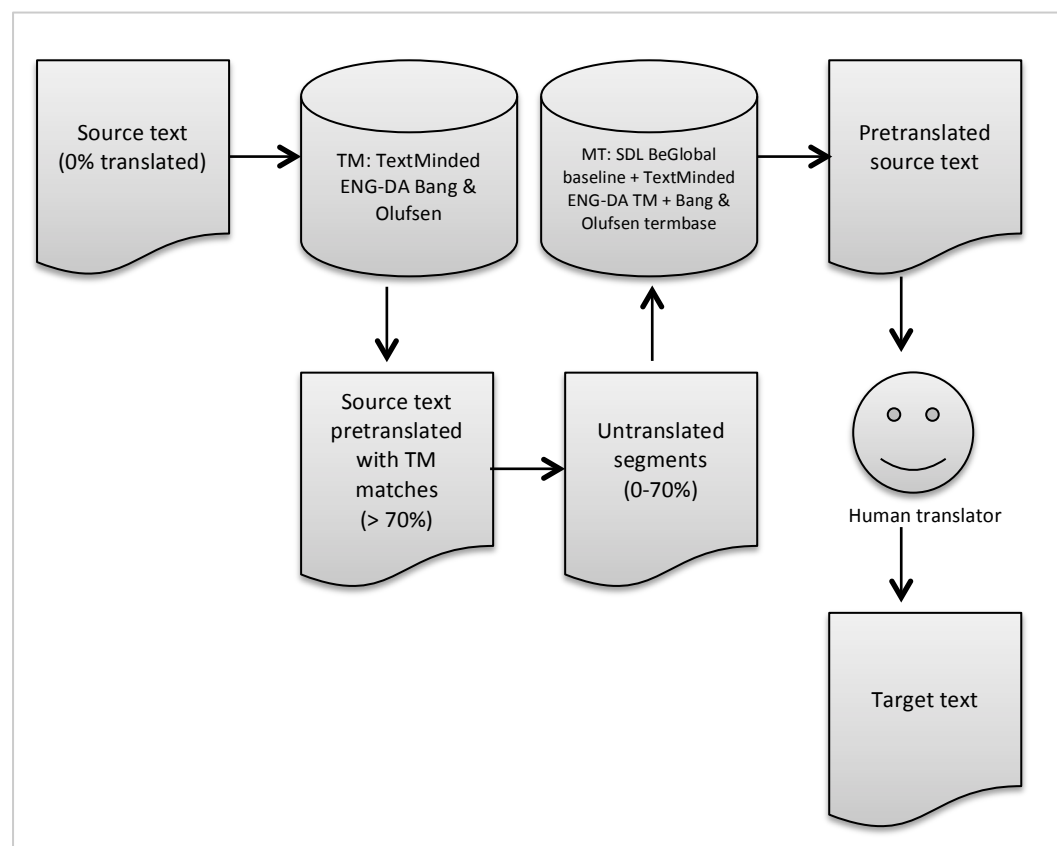


Figure 7. Pretranslation process (inspired by Mesa-Lao 2015, p.4)

The two pretranslated source texts were included in a SDL Trados Studio project package together with the Bang & Olufsen TM and termbase. The project package also contained a reference text for one of the source texts (the FAQ text, cf. Section 4.3.1.1.3.1.3): a PDF file with the fully formatted source text (cf. Appendix 5). Eight identical project packages were created and stored in a folder on one of TextMinded's drives which was accessible to all translators. During the translation process, the MT engine was active so that for each TM match, an MT match was also provided. The MT match was visible to the translators in the Translation Results window in the upper part of the SDL Trados Studio interface (cf. Figure 8), which meant that the translators had the option of replacing a pretranslated TM match with an MT match if they wished to do so. For each TM match, translators could see the

match value, and textual differences between the new source segment and the source segment retrieved from the TM were highlighted. MT matches were clearly marked by the abbreviation “AT” for “Automated Translation”; however, no confidence scores indicating the quality of the provided match were provided. AutoSuggest was enabled so that translators received translation suggestions during typing. CM and 100% matches were marked as *confirmed* translations which meant that if the translators used the shortcut Ctrl+Enter after editing a segment, SDL Trados Studio would skip these segments and place the cursor in the next unconfirmed segment (cf. Section 2.3). It was ensured that the TM was not updated during the course of the experiment so that all translators were presented with the same matches and not matches produced by the translator(s) before them.

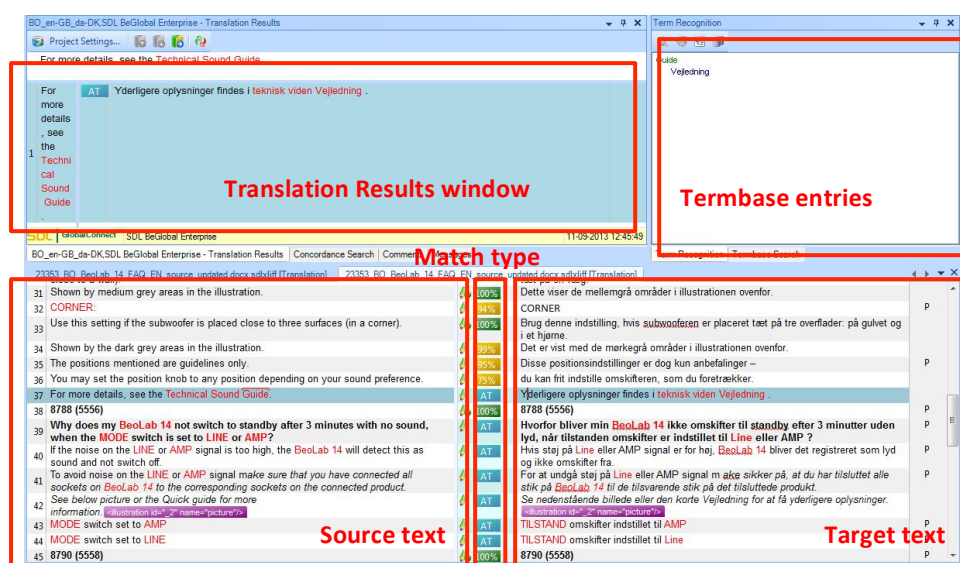


Figure 8. SDL Trados Studio 2011 interface

4.3.1.1.3.1.3 The source texts

The translators were asked to translate two source texts from the Danish company Bang & Olufsen; the company had confirmed that their texts could be used as data in the study. Bang & Olufsen sells high-end audio, video and multi-media products and is a regular client of TextMinded. The source texts were provided by TextMinded and were authentic translation tasks in the sense that the source texts were assignments that TextMinded had previously undertaken for Bang & Olufsen during the two months prior to the experiment. However, the target texts which were sold to Bang & Olufsen had been translated and reviewed by *external* translators, and thus not by the translators who participated in the experiment. Furthermore, the translations were not available online during the time of the experiment.

The source texts were 1) a Frequently Asked Questions (FAQ) text that related to Bang & Olufsen's surround-sound speaker system BeoLab 14, a technical text, and 2) a Newsletter about the music system BeoSound 5, a more creative/marketing-oriented text. The source texts are included in Appendices 1 and 2 together with the pretranslated matches. Both source texts were in English and were to be translated into Danish, the native language of the translators. As mentioned above, for the FAQ text, the translators also received a reference text with the fully formatted source text (cf. Appendix 5).

The FAQ text comprised 625 words and the Newsletter 368 words. Thus, in total, the translators were asked to translate 993 words each. In Table 2, the distribution of words and segments between match types is included for each text.¹⁴

	FAQ text			Newsletter		
Match types	Words	Segments	Words in % of total no. of words	Words	Segments	Words in % of total no. of words
CM	24	2	3.8%	0	0	0.0%
100%	128	28	20.5%	8	1	2.2%
95% - 99%	46	4	7.4%	32	1	8.7%
85% - 94%	30	6	4.8%	43	2	11.7%
75% - 84%	43	3	6.9%	73	5	19.8%
70% - 74%	25	3	4.0%	26	3	7.1%
TM matches in total	296	46	47.4%	182	12	49.5%
MT matches in total	329	30	52.6%	186	13	50.5%
Total	625	76	100.0%	368	25	100.0%

Table 2. Distribution of words and segments between match types in the two source texts

The decision to let the translators translate these two texts was made for a number of reasons. Firstly, for reasons of ecological validity, I wanted the translators to translate authentic, whole texts, i.e. not excerpts of texts, as well as texts of a certain length. As pointed out by O'Brien (2009, pp.261–262) and Muñoz Martín (2010b, pp.181–182; 2012, pp.17–18), working with short texts (in O'Brien's terms between 200 and 300 words and in Muñoz Martín's between 200 and 250) is problematic because translators usually work with longer texts and because, as argued by Muñoz Martín, if we let translators work with short, incomplete texts, "we run the risk of taking somewhat special behaviours – those related to starting to translate a text and also those associated to translating the beginning of a text – as the reference for normal behaviour" (2012, p.18). Further, based on TextMinded's experience with the productivity of the translators, it was estimated that the translation of the texts was manageable within approximately one hour. This was suitable from a practical perspective, since the management at TextMinded was willing to invest approximately this amount of time in this part of the experiment, and from a research perspective, since I wanted it to be possible for the translators to complete the translations in one single sitting and avoid fatigue. A technical text, i.e. the FAQ text, was chosen as one of the texts since technical translation is said to constitute the majority of produced translations (Kingscott 2002). Further, technical translation is said to be the "genre of text (...) most likely to continue driving the use of MT for translation" (Specia 2012, p.2). A more marketing-oriented text, i.e. the Newsletter, was also included in the experiment since MT technology is generally assumed to perform more poorly on appellative texts (Schmitt 2015). Thus, it would be interesting to compare the two. Finally, many thoughts went into the choice of

¹⁴ It is a known problem that the word count in SDL Trados Studio and the word count in, for example, Microsoft Excel differ. As argued by Tatsumi (2010, p.66), it is thus preferable to choose one single way of counting the words in the different segments in order to ensure consistent measurement. In this study, also in line with Tatsumi, Excel is used to count the word number of each source segment using the following formula: =IF(LEN(TRIM(A1))=0;0;LEN(TRIM(A1))-LEN(SUBSTITUTE(A1;" ";""))+1), where "A1" is the cell containing the segment whose number of words we want to count.

client and the choice of translation direction. Since the translators had different areas of expertise concerning text types and translation direction (where some translators translated more often from Danish into English and some more often the other way around), and since certain translators often translated texts from certain clients, it was impossible to find a client, a text type and a translation direction where all translators had the same prerequisites. Thus, it was not possible to control for these aspects. However, in dialogue with TextMinded, it was found that the selected text types, the selected client and the selected translation direction was the best compromise we could make. I shall comment further on this in the discussion section (Section 6.3.1).

In both source texts, TM matches and MT matches were provided for approximately half of the source text words, i.e. TM matches down to a match value of 70% were available for approximately half of the source text words, and the MT engine was used to translate the remaining half of each of the texts. This also meant that the amount of data in each of the TM match types (CM, 100%, 95-99%, 85-94%, 75-84% and 70-74%) was considerably lower than the total number of words translated by means of MT. This has to be taken into account in the interpretation of the findings since the findings pertaining to the different TM match categories necessarily build on less data than the findings pertaining to MT matches.

At least two differences between the FAQ text and the Newsletter are worth noting and should be taken into account in the interpretation of the findings. First, the FAQ text contained tags indicating formatting and the presence of visual elements, whereas the Newsletter did not. Since the translators are typically expected to ensure that a target text contains the same tags as the source text and since tags are not included in the word count above, we would expect the translators to spend relatively more time on the FAQ text. Second, in the case of the FAQ text, the target text that was produced before the experiment had not been included in the TM that was used to train the MT engine; however, this was the case for the Newsletter. This might have resulted in matches of a higher quality in the Newsletter since the MT engine had “seen” the translation before. Both of these issues will be addressed, when relevant.

Finally, since authentic source texts were used, no measures were taken to ensure that the segments were a specific length. The texts thus contained segments consisting of between 1 and 29 words in the FAQ text, and between 5 and 32 words in the Newsletter. This might be problematic, since MT has e.g. been found to perform better on longer segments than on shorter ones (Plitt & Masselot 2010; Federico et al. 2012). However, in balancing comparability and ecological validity, I assigned the latter higher importance (cf. Teixeira 2014b, p.179).

4.3.1.1.3.1.4 Conducting the Machine Translation-assisted Translation Memory translation part & methods for data collection

The MT-assisted TM translation part of study consisted of four steps which are described in the following. Thus, in Section 4.3.1.1.3.1.4.1, the preparations for the experiment are first described (step 1). Next, in Section 4.3.1.1.3.1.4.2, the part of the experiment where the translators translated the two texts is described, including the methods for data collection used in this step (step 2). In Section 4.3.1.1.3.1.4.3, the preparations for and execution of

the retrospective interviews are described (step 3), and in Section 4.3.1.1.3.1.4.4, the post-experimental questionnaire which constitutes the last step in the MT-assisted TM translation part is described (step 4).

The eight translators were asked to participate in the experiment at different times during a week in May 2013. One translator participated in each of the time slots in Table 3.

Monday 27 May 2013, 9 am – 12 pm
Monday 27 May 2013, 13 pm – 16 pm
Tuesday 28 May 2013, 13 pm – 16 pm
Wednesday 29 May 2013, 9 am – 12 pm
Wednesday 29 May 2013, 13 pm – 16 pm
Thursday 30 May 2013, 9 am – 12 pm
Friday 31 May 2013, 9 am – 12 pm
Friday 31 May 2013, 13 pm – 16 pm

Table 3. Time slots for the MT-assisted TM translation part of the experimental study

The translators translated at different times during the week because this made it possible to make participation in the experiment fit into each translator's individual schedule, reducing the disturbance to their usual work. Also, it made it possible for me to observe the translators during the translation process and to carry out the retrospective interview with each of the translators within a few hours of the translation process. The drawback of letting the translators translate the texts at different times during the week was that they might, for example, discuss the texts and their solutions. However, I asked them not to do so (cf. Section 4.3.1.1.3.1.4.1.2).

4.3.1.1.3.1.4.1 Step 1: Preparations

Approximately two weeks prior to the experiment, I tested the experimental setup with one of my colleagues. In the week before the experiment, I installed the keystroke logging and screen recording tools used during the experiment on the translators' computers (cf. Sections 4.3.1.1.3.1.4.2.1 and 4.3.1.1.3.1.4.2.2). Just before each translator's participation in the experiment, he or she received simple instructions. I connected the MT engine in SDL Trados Studio so that the MT engine would be active during the experiment and thus provide the translators with MT matches in TM matches (as described in Section 4.3.1.1.3.1.2). Also, I checked whether the time displayed on the translator's computer was consistent with the time on my computer. This was relevant for the observational protocol I produced during the experiment (cf. Section 4.3.1.1.3.1.4.2.3). The test of the experimental setup and the instructions provided to the translators are described in more detail in the following two sections.

4.3.1.1.3.1.4.1.1 Testing the experimental setup

No actual pilot study was conducted prior to the experiment. I considered the possibility of carrying out a pilot study at TextMinded with at least two translators, but since I did not want to create too much attention about the experiment and since it would disqualify the participating translators from being part of the experiment, I decided to conduct a test of the experimental setup instead. This test was carried out with a colleague of mine, a translator and translation scholar. In the test, she translated the FAQ text in SDL Trados Studio on a laptop I had set up for her at her usual desk. She received the instructions prepared for the experiment, her translation process was captured by means of the keystroke logging and screen recording tools which were also used in the actual experiment, and I observed her during translation. After she had finished translating the text, I prepared for the retrospective interview, identifying segments where she had made many, few and no changes. I found the corresponding spots in the screen recording and created an interview guide. I also identified instances in the observational protocol which I wanted to address in the interview.

The data from the test have not been analyzed, since the test mainly served as a test of the technical setup and as preparation for me. Also, my colleague was not a practising translator, did not have much experience with CAT tools and had no experience with MT. However, the test was productive in that it resulted in appropriate adjustments to the instructions given to the translators and to conducting the retrospective interviews, e.g. in terms of the size and speed of the screen recording shown to the translators as well as in terms of the order in which I addressed the selected discussion points in the interview. Finally and importantly, it served as reassurance that the technical setup worked and that the retrospective interview was manageable within the allotted time.

4.3.1.1.3.1.4.1.2 Instructions

Shortly before each translator was to participate in the experiment, they received a one-page document with instructions (cf. Appendix 3) via e-mail that constituted the translation brief. The translators also received the instructions on paper and were given time to read them thoroughly. Afterwards, I explicitly asked all translators whether they had any questions. The document included a link to the translator's project package. The translators were told to translate the FAQ text first and then the Newsletter. The fact that all translators translated the texts in this order entails a risk that if, for example, editing MT matches gets easier and faster as the translators translate, this means that they will edit MT matches faster at the end of the FAQ text than in the beginning and faster in the Newsletter than in the FAQ text. According to Jakobsen (2011, p.40), this is the "facilitation effect", and Saldanha and O'Brien (2013, p.114) refer to it as the "carry-over effect".

In the instructions, the translators were told to translate the texts as they normally would translate such texts. Since the translators normally produced translations of publishable quality, the intention with this instruction was that they should also do so in the experiment. Thus, they were not provided with any specific post-editing guidelines. This also meant that they were free to revisit previous segments and to perform checking of their translations if

they wished to do so. In the instructions, the translators were also informed that the FAQ text contained a number of words formatted in red and that these words were to remain untranslated in the target text. In this connection, they were told that they could consult the reference text. Furthermore, the translators were informed that two programmes (Inputlog and BB FlashBack Express) would be recording their translation processes, and that the data would be anonymized. Finally, they were asked to let me know when they had finished the translations and not to discuss these assignments with their colleagues. They were also told that we were going to discuss their translation processes after a pause of approximately one hour after they had finished translating. No specific time limit was set for the translators' completion of the two translations.

4.3.1.1.3.1.4.2 Step 2: Translation process

During the translation of the two source texts, in order to maximise ecological validity, the translators worked at their usual desks, with their usual computers, with their usual CAT tool and with their usual colleagues around them. They had access to the Internet, all their regular resources (such as dictionaries) and their browser favourites and history, and they were free to use the keyboard shortcuts which they preferred, e.g. to move from one segment to the next. Letting the translators work on their own computers also meant that they worked with their own settings in SDL Trados Studio in terms of how tags were displayed.¹⁵ The data collection methods used in this step of the experiment were keystroke logging, screen recording and observation. These will be described in the following sections.

4.3.1.1.3.1.4.2.1 Keystroke logging

Several scholars have reported difficulties in applying keystroke logging in combination with commercial CAT tools (cf. Mesa-Lao 2011; Ehrensberger-Dow 2014; Ehrensberger-Dow & Massey 2014; Carl et al. 2016). This is particularly problematic in terms of obtaining data on the time spent by translators on individual segments (Moran, Lewis, et al. 2014) and seems to be one of the reasons why researchers may ask translators to work with unfamiliar tools specifically developed for experiments or have imposed unfamiliar requirements or limitations on the translators' ways of working during experiments (cf. Chapter 3).

Some logging systems are limited to logging activities in their own editors (e.g. Translog) which disqualified them from use as it was essential that the translators worked with their usual CAT tool. At the time of data collection, to my knowledge, the only keystroke logging programs able to log data outside their own editors were uLog and Inputlog (WritingPro 2013). The current version of uLog (Noldus 2013) was only able to run on computers with Windows XP, and the computers at TextMinded all had Windows 7 as their operating

¹⁵ For example, some translators only had tags displayed which indicated the presence of visual elements (Translators B, G and H), whereas others had tags indicating both formatting (such as bold, italics and text colour) and the presence of visual elements (Translators A, C, D and E) displayed.

system. Thus, uLog was not a viable solution.¹⁶ I also tested Inputlog (Leijten & Van Waes 2006; Leijten & Van Waes 2013), which has been used successfully in combination with Trados Translator's Workbench (Torres-Hostench et al. 2010; Lacruz et al. 2012). I tested Inputlog's ability to log data in SDL Trados Studio 2011, both with an expert in Inputlog and an expert in SDL Trados Studio 2011, and found that Inputlog logged insufficient information in SDL Trados Studio 2011.¹⁷ Inputlog was able to log what a translator typed, but it was not able to identify the position of the typing. As a result, there was no way of automatically relating any information to specific segments. Also, although it was visible in the log file when a translator deleted something, the extent of the deletion was not logged. Other problems with Inputlog were that it could not log the proposed matches from the TM or the MT engine, nor could it log if a translator e.g. copied a term from the Internet and pasted it into SDL Trados Studio. As a result, since I insisted on letting the translators work with their familiar CAT tool, I abandoned keystroke logging as the primary method for obtaining segment-level process data, choosing instead to use Inputlog as a secondary data collection method for crosschecking the data collected by means of screen recording.

4.3.1.1.3.1.4.2.2 Screen recording

Given the identified difficulties with using keystroke logging for obtaining segment-level process data, I turned to screen recording. I had planned to employ screen recording anyway, but it now became the main method for collecting process data. By using screen recording, I was able to view how the translators interacted with the MT-assisted TM tool in each segment. I decided to use BB Flashback Express, free software which I could easily install on all translators' computers prior to the experiment. The software records the activities on the translator's screen without being visible to the translator. As such, it supported the aim of obtaining ecological validity. BB FlashBack Express also allows for the recording of sound and facial expressions; however, these functionalities were not utilised in the experiment. Instead, I observed the translators during the experiment as explained in the next section. After each translator had participated in the experiment, I moved the recorded video file (together with the keystroke logging file and the target texts) to my own computer.

4.3.1.1.3.1.4.2.3 Observation

In addition to keystroke logging and screen recording, I also observed the translators while they translated the two texts and noted observable and audible actions in an observational protocol together with the time of such actions. For example, I noted if the translators

¹⁶ Before the data collection, I contacted the developers of uLog who informed me that a version for Windows 7 was underway. They offered me the opportunity of testing a beta-version of the new software, but uLog was unfortunately not able to log the data I needed.

¹⁷ The reason for the incompatibility of Inputlog with SDL Trados Studio 2011 might be that this version of Trados applies a so-called side-by-side environment, where translation is carried out in the Trados editor itself. In the previous version, Trados Translator's Workbench, a so-called hybrid translation environment was used, which meant that texts were translated in Word (Christensen 2011).

talked to their colleagues or to me, used their phones, said anything to themselves out loud, laughed or had frustrated or other facial expressions during the experiment. This was especially relevant in connection with the retrospective interviews in that it made it possible for me to address such instances, and because it allowed me to take disturbances into account when measuring the time the translators spent on editing each segment (cf. Section 5.3.1.1.2).

4.3.1.1.3.1.4.3 Step 3: Retrospective interview

As step 3 in the experiment, cued retrospective interviews were conducted with each of the translators approximately one hour after their participation in the experiment. In the one-hour pause, I used the software SDLXLIFF Compare (SDL AppStore 2016) to compare both of the translator's translations with the pretranslated TM and MT matches. SDLXLIFF Compare displays the comparison results in a report, highlighting modifications made by the translator. Thus, SDLXLIFF Compare was an efficient tool for gaining a quick impression of the extent of the translator's modifications in each segment. On the basis of the reports, I identified segments in which the translator made many, very few or no changes. Afterwards, I watched the screen recording of the translator's translation process at an accelerated speed with a specific focus on the segments identified from the SDLXLIFF Compare report. While doing this, I created an interview guide. In this, I noted the segment number of each segment, the time in the screen recording in which the translator worked with the particular segment, as well as my notes regarding my observations while watching the recording. In that way, I could easily find the specific segments during the interview. Also, during my preparations, I read through the observational protocols and included instances in the interview guide which I wanted to address in the retrospective interview. By comparing the time of these instances (which I had noted in the observational protocols) with the time displayed on the translator's computer (visible in the screen recording), I was able to identify which part of the screen recording I wished to show to the translator when asking him or her about the instance noted in the protocol.

After these preparations, I conducted the interview with each of the translators in a meeting room. In each of the interviews, I started out by thanking the translator for agreeing to participate, and explained that what we had in front of us was the video of the translator's process which had been recorded during translation. I also explained that the yellow "dot" visible on the screen was the location of the translator's mouse. The interview was divided into two parts: a part with replay and a general part. In the part with replay, on the basis of the interview guide and while watching the corresponding parts of the recording, I asked the translator to verbalize what he or she remembered thinking while translating the specific segments. In this way, following Ericsson and Simon's advice (1984, cf. Section 3.3.2), I instructed the participant to report cognitive processes which he or she remembered heeding at the time. In the general part, I asked the translators questions about their participation in the experiment, factors influencing their translation processes and TextMinded's perception of translation quality.

As shown in Table 4, the part with replay lasted from 28 minutes (Translator E) to 42:35 minutes (Translator D). The general parts of the interviews were shorter, lasting between 9:09 minutes (Translator C) and 15:12 minutes (Translator D). All interviews were transcribed, following the procedure described in Section 4.3.2.2.

Translator	Duration of part with replay	Duration of general part
A	29:15	9:15
B	28:28	12:04
C	31:24	9:09
D	42:35	15:12
E	28:00	10:33
F	40:54	12:51
G	31:10	10:54
H	34:11	12:29

Table 4. Duration of retrospective interviews

As mentioned above, segments where the translators had made many, few or no changes were selected. As pointed out by Muñoz Martín (2010b, p.182) and reiterated by Risku (2013, p.6), if we want to gain insight into translation processes, unproblematic segments of text are at least as interesting as problematic segments. Also, in order to answer RQ1a, which aims to characterize the translators' interaction with the MT-assisted TM tool when they choose to accept, reject or revise a match, it was interesting not only to ask the translators to verbalize their thought processes concerning segments with many changes, but also to prompt their thoughts about the segments which seemed to have been accepted or only minimally revised. However, Englund Dimitrova and Tiselius argue that working memory and short-term memory "work in an automatized mode, unless the process is stalled by a difficulty or a problem" (2014, p.180), and that the memory of how such a situation is solved may enter into long-term memory, but not necessarily so. Since retrospective interviews are meant to tap into long-term memory, it may thus be difficult to get the translators to verbalize their thoughts about segments that were accepted without changes and that probably did not cause the process to be stalled. Other limitations related to retrospective interviews were mentioned in Section 3.3.2. Particularly relevant in this regard is the fact that all the translators had many years of experience which might lead to automaticity.

4.3.1.1.3.1.4 Step 4: Questionnaire

The final step in the translation part of the experiment involved the translators filling out a post-experimental questionnaire, which I asked the translators to do after the retrospective interview (see Appendix 4). The translators received the questionnaire on paper, but I also offered to e-mail them an electronic version if they preferred. Five translators filled it in by hand and three did it electronically. The questionnaire contained both open and closed questions, generating both quantitative and qualitative data (Christensen & Schjoldager 2011, pp.121–122). The first nine questions asked for background information on the translators such as age, job title, education, experience with professional translation and which languages the translator usually translated to and from. The next three questions

related to the translator's participation in the experiment and whether the translator had experience of translating the text types translated in the experiment, whether he or she had experience of translating for Bang & Olufsen, and whether the translator thought that his or her translation process had been affected by the fact that it was an experiment. In the next two questions, the translator was asked to indicate the percentage of his or her work typically involved in translating and reviewing other translators' work. Then the translator was asked whether he or she had experience of MT, about his or her attitude to MT and about his or her expectations regarding the consequences of MT for his or her future as a translator. Finally, the translator was asked to note any further comments he or she might have. Although part of the information generated through the questionnaire could have been obtained in advance of the experiment, I decided to wait until their participation in the translation part of the experiment had been completed to avoid them becoming too self-conscious (Ehrensberger-Dow 2014, pp.368–369).

4.3.1.1.3.2 The review part

Since review was an integrated part of the typical *tandem translation* workflow (cf. Section 5.1.2), it was decided in collaboration with TextMinded that the experiment should also include a review part. For time reasons, it was agreed that each translator should review one of their colleagues' translations from the translation part of the experiment. Thus, in the review part, half of the translations produced in the translation part were reviewed. On the 27th of June 2013, I sent out an email to the translators¹⁸ who had participated in the translation part of the experiment, informing them that there would be a review part in August 2013. In it, I stated that I hoped they would each be willing to review one text (of a maximum of 650 words), and that I hoped they would let me know if they did not wish to participate. They were also informed that they would receive the translation on Monday the 19th of August, were expected to return the reviewed text on Friday the 23th of August, and could carry out the task at any point at their convenience during the intervening time. Finally, although the week had been chosen in collaboration with the key account manager who was responsible for distributing internal resources, the reviewers were told that if the week was not suitable, they should just let me know and we would find a solution. The review part was conducted approximately three months later than the translation part with the hope that the reviewers would review the translations as texts in their own right and not implement changes because they remembered that they themselves had made other translation decisions.

Four reviewers were given the task of reviewing a translation of the FAQ text, and the remaining four were asked to review a translation of the Newsletter. The reviewers were thus divided into two groups. This division was informed by information which the translators had provided in the post-experimental questionnaire, primarily in their answers to question 14 concerning the proportion of their work tasks that normally involved review. Thus, for example, Translators B and F, who indicated the largest proportion of review work

¹⁸ When referring to the review part of the experiment, I shall call the translators "reviewers". Further, they are referred to with the same letter as in the translation part, i.e. Translator A is referred to as Reviewer A.

(90% and 80%, respectively), were assigned to different groups. The reviewers were divided as shown in Table 5, where Reviewer B reviewed Translator E's translation of the FAQ text, while Reviewer E reviewed Translator B's translation of the Newsletter and so forth.

Review of FAQ text	Review of Newsletter
Reviewer B (Translator E)	Reviewer E (Translator B)
Reviewer H (Translator F)	Reviewer F (Translator H)
Reviewer A (Translator D)	Reviewer D (Translator A)
Reviewer G (Translator C)	Reviewer C (Translator G)

Table 5. Reviewers and assigned translations

On the morning on Monday the 19th of August, I sent out separate e-mails to the eight reviewers, asking them to review the attached, anonymized translation (an SDL Trados Studio (SDLXLIFF) file) as they normally would review such a text. They were instructed to perform the review in SDL Trados Studio with the Track Changes function activated. They were also asked to note the time they spent on the task and to include the time spent in the e-mail when returning the reviewed file to me. The reviewers who were asked to review a translation of the FAQ text were told that the translator had been informed that words formatted in red should remain untranslated in the target text. Since the reviewers received the files in SDLXLIFF format, they were able to see the source text as well and they could see the provenance of each match (i.e. whether it was an MT or TM match, and, in the case of a TM match, which match value it had). The TM, the MT engine and the termbase were not accessible to the translators during review.

4.3.1.1.3.3 Collected data

Accidentally and unfortunately, Translator F deleted his screen recording file after participating in the experiment. Thus, following from the process described above, after the experimental study had been conducted, I had a keystroke logging file, a screen recording file and an observational protocol from each translator apart from Translator F, from whom I only had the keystroke logging file and the observational protocol. Each keystroke logging file, screen recording file and observational protocol contained data regarding one translator's processes when translating both the FAQ text and the Newsletter. Since I did not have the screen recording file from Translator F, it was not possible to conduct a cued retrospective interview with him similar to the other ones. However, using the SDLXLIFF Compare report as a cue, I conducted the interview with Translator F anyway. Thus, after the experimental study, I had 16 SDLXLIFF Compare reports (one report for each of the two texts for each of the eight translators), eight interview guides and eight audio files with the recorded retrospective interviews.¹⁹ The interview guides and audio files related to both the FAQ text and the Newsletter. Finally, I had eight completed post-experimental questionnaires.

¹⁹ By mistake, after Translator H's participation in the MT-assisted TM translation part and the one-hour break in which I prepared the interview, I only conducted the replay part of the retrospective interview. However, on the following day, she participated in the general part.

4.3.2 Methods for data analysis

The methods applied in the analyses pertaining to each of the seven overall research questions are explained in detail in the introduction to each of the analyses in Chapter 5. Therefore, in the following, only some general reflections as to the data analysis are provided. These include an elaboration on my definitions of the editing and checking phases and some overall considerations as to the mixing of the qualitative and quantitative parts of the study in terms of the data analysis. In Section 4.3.2.1, the so-called “observer effect” is discussed, and in Section 4.3.2.2, the procedure applied for transcribing both the semi-structured and the retrospective interviews is presented.

In Chapter 5, RQ1-RQ6, which explore TCI processes, are answered in an order which follows a workflow logic (cf. Figure 9). Thus, first, research questions RQ1, RQ1a, RQ2 and RQ3 which cast light on the editing phase of the translation processes are addressed. Then, RQ4 which addresses the checking phase is answered. Next, RQ5 which draws on data from both the editing and checking phases is addressed. As I established already in Section 1.2, I consider the *editing phase* to be the part of the MT-assisted TM translation process when the translators first evaluate the matches and, when necessary, modify them. Inspired by the drafting phase in Jakobsen’s (2002) tripartite model of the translation process as explained in Section 3.2.1, more specifically, I define the editing phase as the phase running from when the translator starts working with the first segment of the text until he or she finishes working with the last segment in the text. Inspired by Jakobsen’s end revision phase, in this thesis, by *checking phase* I mean the translator’s potential final examination of whether the target text is adequate, and more specifically, I consider this phase to run from the translator’s return to the first segment after the *editing phase* until he or she decides that the translation is finished. After having dealt with the research questions concerning the editing and checking phases, RQ6 is answered, which deals with the review part of the experimental study. As also mentioned in Section 1.2, *review* is defined as the examination of the translation conducted by a person other than the original translator which I regard to cover both bilingual (comparison of source and target text) and monolingual (review of target text) examination of the translation. Finally, the last part of Chapter 5 attends to RQ7, which explores the translators’ attitudes to TCI.

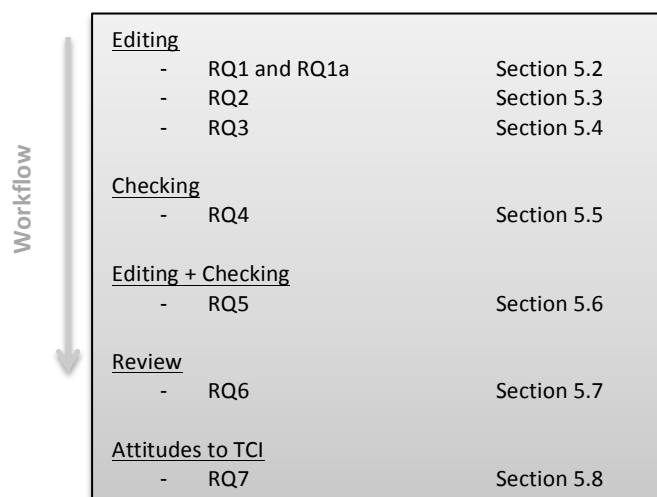


Figure 9. Structure of analyses in Chapter 5

In mixed methods terms, the qualitative and quantitative parts of the study are not only combined at the design and data collection stages as explained earlier in this chapter, but also at the data analysis and interpretation stages. At the data analysis stage, the two forms of data are integrated by, for example, cross-checking a qualitative analysis of the screen recordings with quantitative data from keystroke logging, and through data conversion. In terms of data conversion, when addressing RQ1-RQ6, some of the qualitative data are quantitized. When relevant, this will be addressed further in the analyses pertaining to the individual research questions. Following the process of data conversion, these data are analyzed by means of descriptive statistics. This is in line with the purposive sampling technique as well as the research questions which are largely explorative and descriptive in nature (Onwuegbuzie & Leech 2005, p.287; Teddlie & Tashakkori 2009, pp.23–24). The integration of qualitative and quantitative parts at the interpretation stage is accomplished in part in the syntheses following the individual analyses in Chapter 5, and in part in the discussion section in Chapter 6.

As indicated above, the analyses mainly draw on data generated as part of the experimental study. However, the contextualization which precedes the individual analyses in Chapter 5 draws on the data collected as part of the contextual study, as does the analysis addressing RQ7. In the remaining analyses, the data from the contextual study are brought into play when I find them to inform the analyses. Since, as mentioned in Section 4.3.1.1.3.3, Translator F accidentally deleted his screen recording file after the experiment, data from his translation processes are only included in analyses that do not draw on screen recording data.

4.3.2.1 The observer effect

A threat to the validity of the collected data is the possibility that those I observed at TextMinded reacted atypically because of my presence. Daymon and Holloway (2011, p.275) refer to this as the “observer effect” and O’Brien (2009, p.258) calls it the “white coat effect”. Saldanha and O’Brien (2013, pp.29–32) also point to the risk that people change their normal behaviour, usually by improving it, when they know that they are being studied, referring to this as the “Hawthorne effect”. Specifically with regard to TPR, Hansen identifies this awareness of being studied as a weakness. She states that “[k]nowing about the experiment and feeling observed may have an impact on the results because nervousness or stress changes the participants’ mental processes and the intensity of this impact cannot be measured precisely” (Hansen 2013b, p.97). The best we can do is to reflect on the impact this may have on our findings. Daymon and Holloway note that the observer effect “tends to disappear the longer you are able to spend in the research setting” (2011, p.275). In the current thesis, the hope was that my regular visits at TextMinded as part of the preparations for the study and my presence at TextMinded for several weeks would help the employees to go about their tasks in their accustomed ways. A risk that is particularly relevant for this study was that the fact that the study was conducted around the time when MT was first implemented at TextMinded, and that this could impact on the translators’ behaviour. I never specifically stated that I was particularly interested in MT, but at least some of the translators expected me to be so. This might have led them to tone down their scepticism out of politeness, or it might have reinforced negative attitudes to MT if the

translators took the experiment to be an opportunity to voice their scepticism and potentially influence the decision of implementing MT. In relation to the experiment, the translators' and reviewers' work may also have been influenced by the fact that the translation was not to be delivered to the client afterwards (cf. Mossop 2007a, p.17).

O'Brien (2009, pp.258–259) states that participants will sometimes voluntarily inform the researcher that they have behaved differently than normal. However, in the current study, considerations as to the observer effect led to the specific formulation of a question in the post-experimental questionnaire which asked the translators whether or not they thought their processes had been influenced by the fact that they were participating in an experiment and asked them to explain why this was or was not so. As shown in Figure 10, four answered "yes", three translators answered "no", and one answered "no" and added "maybe a little". Translators E and H answered "yes" and explained that they did not let the process be interrupted in different ways. Translator F also answered "yes" and explained that he might have put a little more thought into his solutions than usual. Thus, this indicates that he attempted to improve his performance, as suggested by Saldanha and O'Brien. Translator A also answered "yes", but her explanation was somewhat ambiguous. On the one hand, she stated that she spent less time checking terms and polishing expressions than usual and said that she would usually also have consulted one of her colleagues. This suggests that participation actually led to a drop in her performance. On the other hand, she stated that in terms of her "approach", she worked as she normally did. It is unclear what she meant by this. Translator C answered "no" and added "maybe a little". She stated that she worked as she usually would, but interestingly, she also stated that she might have been affected by the time factor, but that she "managed to finish in time". The translators were at no point informed that they had a restricted amount of time to finish the translations, but because of their professional schedules, we had to book time in their calendars for participating in the experiment. As this was estimated to take three hours in total, she must have had an impression that she had to finish within a certain time. The remaining three translators (B, D and G) answered "no", and Translator G added that during the retrospective interview, he could see that he had worked as he normally would. None of the translators mentioned that the presence of MT influenced their way of working.

Further, it is evident from my field notes (and my memory) that the employees at TextMinded were very open and welcoming towards me. Several times in my field notes I have noted that I felt at home and that, towards the end of my stay in particular, the employees asked me whether I was coming back and that I was always very welcome. I take that as an expression that they felt at ease with me being there. I expect this to have impacted positively on them behaving naturally in my presence as opposed to if I had only come in during the week when the experiment was conducted.

Post-experimental questionnaire, question 12 (translated from Danish):
Do you think the way you worked today was influenced by the fact that you knew that you participated in an experiment (tick the appropriate box)?

Yes ☐ No ☐

Explain here why you think that it did/did not influence your way of working:

Translator answers (translated from Danish):

<u>Translator A:</u>	<i>Yes – I spent less time on checking terms and polishing expressions than I would have done if the translation had to be delivered to the client. Normally, I would also have asked one of my colleagues for advice on some of the expressions which caused problems. But in terms of my approach there was no difference between a “real” translation situation and the experiment.</i>
<u>Translator B:</u>	<i>No</i>
<u>Translator C:</u>	<i>No (maybe a little) – I have worked in the same way as I normally do, made the same considerations, but the time factor might have played a role. However, I managed to finish in time.</i>
<u>Translator D:</u>	<i>No</i>
<u>Translator E:</u>	<i>Yes – If it had not been an experiment, I would probably have taken a small break.</i>
<u>Translator F:</u>	<i>Yes – Maybe a little more attention to solutions. A little more thought was given to alternatives.</i>
<u>Translator G:</u>	<i>No – I deliberately tried to work as I normally would and in the following talk I could see that I succeeded in that.</i>
<u>Translator H:</u>	<i>Yes – I did not let myself be interrupted by colleagues/e-mails.</i>

Figure 10. The observer effect - answers to question 12 in the post-experimental questionnaire

4.3.2.2 Transcription of interviews

The semi-structured interviews and retrospective interviews from the experiment were transcribed on the basis of the audio files. According to Kvale and Brinkmann (2009a, p.199 ff.), transcription is a process of interpretation and is thus the first part of the analytical process. In fact, Kvale and Brinkmann (2009a, p.200) state that transcription is a translation from spoken to written language which results in an impoverished and decontextualized rendition of a conversation. In line with this, Halkier (2008, p.70) states that transcription is a reduction of data, but nevertheless a necessary one.

The choice of who should do the transcription has been discussed (cf. e.g. Gibbs 2007, pp.15–17; Kvale & Brinkmann 2009a, p.202). Gibbs states that it is an advantage for the researcher if s/he does the transcription him/herself, because it is an opportunity to start the data analysis. However, he also states that it also is a good option to employ someone else to transcribe if the audio files are easily understandable, and that it is best if the transcriber knows something about the subject matter and the context of the interviews.

Kvale and Brinkmann state that in most interview studies, a secretary would do the transcriptions, and that researchers who are particularly interested in communication form and language style can choose to transcribe themselves in order to capture the many details relevant to their specific analyses. In the current thesis, the interviews were first transcribed by a Masters student in Translation and Interpreting at the Department of Business Communication, Aarhus University. I then double-checked all of the transcriptions while listening to the audio files, making a limited number of amendments.

It is generally agreed that the level of detail in transcriptions should be determined by the purpose of the study in question (Gibbs 2007, p.10ff.; Koskinen 2008, p.88; Kvale & Brinkmann 2009a, p.202ff.). Like Koskinen (2008) and Jensen (2013) in their analyses of focus group interviews, I tried to balance analytic needs and readability by keeping transcribing conventions to a minimum. Thus, the interviews were transcribed in full and, for example, “pauses and overlaps are roughly marked, but their durations are not calculated, and phonetic features such as pitch and intonation are unmarked” (Koskinen 2008, p.88). This also means that I have chosen not to follow more complex systems such as the Text Encoding Initiative (TEI) and the *Gesprächsanalytisches Transkriptionssystem* (GAT) described by Göpferich (2008; 2010). The TEI system comprises guidelines on transcribing in a machine-readable format so that transcripts can be analyzed automatically using electronic support, which is not relevant for me in this context. Further, I found the GAT system too detailed in terms of my analytic needs; however, there are overlaps between the features marked in the transcriptions in the current study and the features marked when following the GAT system.

Following Kvale and Brinkmann’s recommendation (2009a, p.203), the transcriber was provided with explicit guidelines asking her to transcribe all words as they were said by the respondent (i.e. that she should not “tidy up” their speech if it did not follow the grammatical rules used in writing), and to mark any spot that she found difficult to hear instead of guessing so that I could pay particular attention to those spots when checking the transcripts. She was also provided with a list of transcription symbols (cf. Figure 11) and signed a non-disclosure agreement.

Transcription symbols:	
Bold	Emphasis
[]	Overlaps in speech
...	Short pause
(pause)	Longer pause
(laughter)	Laughter
()	Indecipherable talk
In parenthesis	Added remarks
KB	Researcher
A – Z	Participant

Figure 11. Transcription symbols

4.3.3 Ethical considerations

With the assistance of the Technology Transfer Office at Aarhus University, a collaboration agreement was set up between TextMinded and Aarhus University with me as the project responsible. According to the agreement, TextMinded accepted to be mentioned by name in relation to the study, and it was agreed that data collected in the study must be kept confidential and that data from individual employees were to be anonymized. For reasons of confidentiality, the transcriber of the retrospective and semi-structured interview was asked to sign a non-disclosure agreement, as mentioned above. TextMinded obtained permission from Bang & Olufsen to use their material in the study. Bang & Olufsen also agreed to be mentioned by name in relation to the study.

As explained in Section 4.3.1, prior to the workplace study, I sent out an e-mail to all employees at TextMinded where I informed them about my stay and emphasized that their statements would be anonymized, and all data would be kept confidential. In the instructions the translators received just before their participation in the experiment, as mentioned in Section 4.3.1.1.3.1.4.1.2, the translators were informed that their translation processes would be recorded and that the data would be anonymized and kept confidential. The translators did not sign individual consent forms in relation to their participation in the experiment due to the collaboration agreement.

Chapter 5

Analyses and results

Chapter 5. Analyses and results

Section 5.1 contextualizes the analyses presented in this chapter by briefly introducing the background for the implementation of MT at TextMinded (Section 5.1.1), the typical workflow as I observed it at TextMinded (Section 5.1.2) and individual differences between the translators (Section 5.1.3), since these aspects are relevant for the understanding of the analyses. Following this contextualization, each research question is dealt with in a separate subsection. As described in Section 4.3.2, RQ1-RQ6 are answered in an order which follows a workflow logic. These are addressed in Sections 5.2 to 5.7. In Section 5.8, the analysis addressing RQ7 concerning the translators' attitudes to TCI is presented. Each of the sections is prefaced with an introduction outlining the research question investigated and the data used. Then, the analytical method is described, and relevant limitations are discussed. Following this, the results of each analysis are presented, and the results are synthesized and discussed.

5.1 Contextualization: Setting the scene

The following sections aim to contextualize the analyses in three ways: by introducing the background and motivation for TextMinded's implementation of MT, outlining the workflow at TextMinded, and describing individual differences between the participating translators. Thus, the following sections are intended to frame the readers' understanding of the analyses to come, as they have done mine.

5.1.1 Considerations about the implementation of Machine Translation at TextMinded

TextMinded was briefly described in Section 4.3.1, and in this section, the LSP's considerations about implementing MT are reflected upon. The reflections build on data collected as part of the contextual study as well as on discussions in meetings held between myself and different employees at TextMinded as preparation for the workplace study. These preparatory meetings mainly concerned the design of the experimental study and took place in the Aarhus and Vejle offices.

As described in Section 4.3.1, TextMinded is the result of a merger between two LSPs. According to one of the managers, part of the motivation behind the merger was the potential for technological development which the two companies were in a better position to accomplish together. This included the implementation of MT, and according to management, the implementation of MT was a necessary step for the company's future. Consequently, in the period between the first meeting between myself and TextMinded in June 2012 and the beginning of the workplace study in February 2013, TextMinded had developed their MT setup. In the process, they considered different baseline MT engines, but ended up opting for SDL's MT system BeGlobal. Although several parameters were considered, it was likely a consequence of the fact that the primary CAT tool used at

TextMinded at the time was SDL Trados Studio. TextMinded also had different considerations as to how to conduct the training of MT engines, and ended up with a solution where they trained the baseline BeGlobal engine with all of TextMinded's TM data on a specific language combination and with terminology from the client in question. TextMinded wished to reach a solution where TM, MT and terminology were integrated during translation. This built on a perception of TM and terminology as essential components in translation. In the words of one of the managers, terminology is "the key to everything" and translating without TM is like "driving without a seat belt". Uncertainties related to the implementation of MT included the pricing of MT matches and the appropriate threshold between TM and MT. In the standard workflow at TextMinded, translations were always reviewed by a person other than the translator (*tandem translation*, cf. Section 5.1.2) before delivery to the client. TextMinded had no intention of changing this after implementation of MT. As part of the preparations for the implementation of MT, two webinars on MT and post-editing were held at TextMinded during the first week of my stay (in February 2013), hosted by SDL. A number of the employees at TextMinded participated in these webinars, although of the translators, only Translators B, D and F attended (Translator D attending both the webinar on MT and the one on post-editing, whereas Translators B and F only attended the one on post-editing). As mentioned in Section 4.3.1.1.1.1, I participated in both webinars.

5.1.2 Workflow context

My observations of daily life at TextMinded, the semi-structured interviews with management and project managers and the documents I collected provided me with information about the workflow at TextMinded. In interviews with project managers, we discussed the typical workflow as well as alternative setups, and by observing the project managers' work, I gained insights into the workflow, including, but not limited to, handling requests for translations from clients, preparing quotes, defining the workflow, communicating with internal and external translators and reviewers, and delivering the finished translations. As explained in Section 4.3.1.1.1.1, I followed some of the translations tasks which were solved internally, i.e. by in-house translators and reviewers, from project initiation at the project manager's desk, to translation and review and back to finalization by the project manager. Furthermore, I collected various materials related to the workflow at TextMinded. In the following, I shall illustrate the typical workflow. In addition to framing the understanding of the analyses in this chapter, this also can be considered to provide a modest contribution to understanding "the real genesis" of translations in practice, a focus called for by Risku and Windhager (2013, p.43).

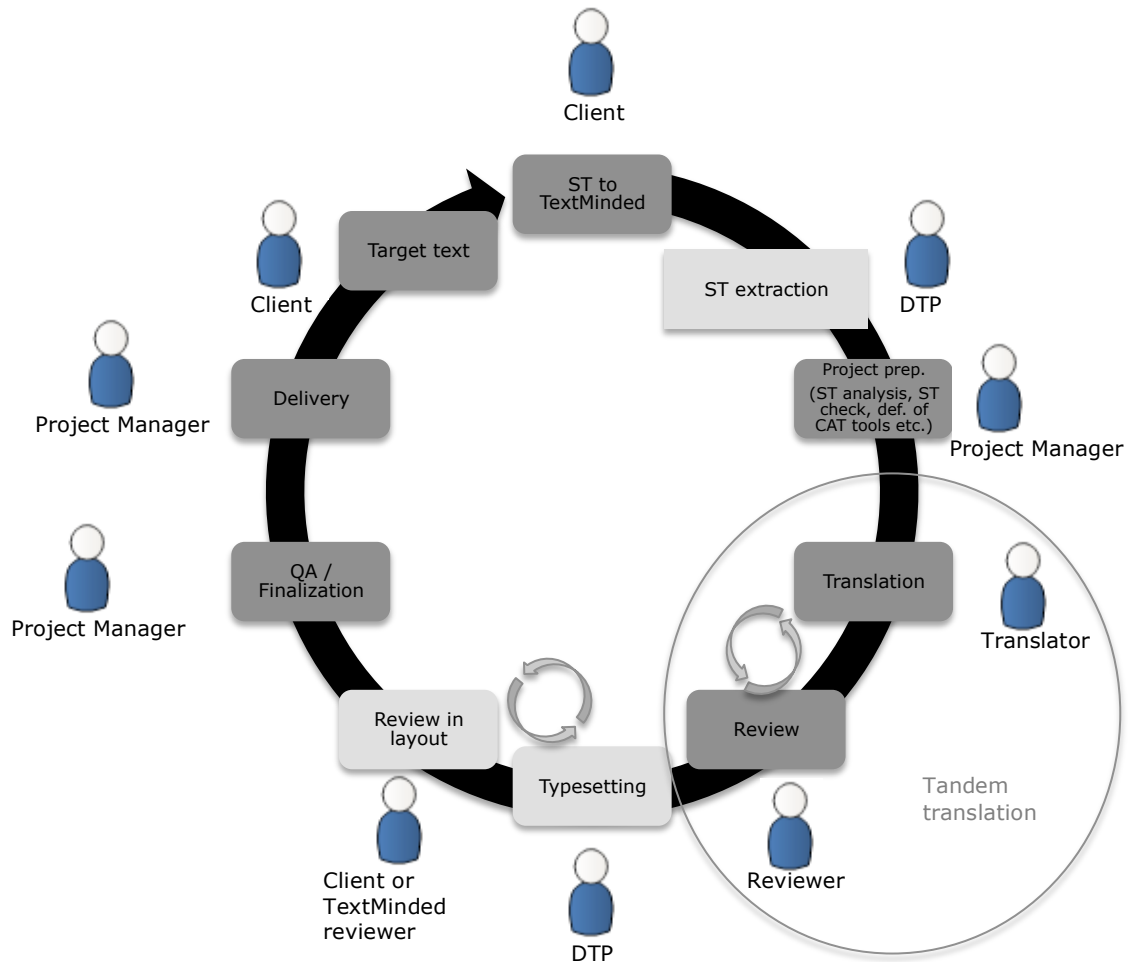


Figure 12. Translation workflow at TextMinded

The standard workflow at TextMinded is the *tandem translation* workflow (illustrated by the dark grey elements in Figure 12). In this setup, TextMinded receives a source text to be translated from a client, typically via e-mail or, for some of the large clients, via an online portal.²⁰ The translation project is then prepared by the project manager. This preparation may entail a variety of tasks, but it always includes the creation of the project in the project management system by means of which a project folder is created for each project. In this folder, all communication with the client is stored as well as the source and target texts in all versions and reference material provided by the client. During the preparation phase, the project manager also identifies the translator and the reviewer to be involved in the project, and defines these roles as well as, for example, language combination, text genre and the CAT tool (including e.g. TM(s) and termbase(s)) to be applied, in the project management system. Furthermore, the project manager typically checks the source text (often by use of a macro) for issues that may cause problems in the CAT tools, such as undesirable line breaks and punctuation. The project manager also conducts an analysis of the source text,

²⁰ A number of different web-based tools were used for communicating with large clients, exchanging jobs and conducting review of target texts in layout.

identifying the extent to which content in the TM can be recycled in the translation. When the project is prepared, the project manager sends the project to the translator and the reviewer. The translator then translates the source text in the CAT tool²¹ and afterwards sends the target text to the reviewer who makes the changes he or she deems necessary. The reviewed target text is then returned to the translator who goes through the reviewers' changes and implements these as he or she sees fit. It is this Translator → Reviewer → Translator collaboration which is referred to as "tandem" translation. The translator and the reviewer may either be in-house or external translators, according to the specific workflow. Afterwards, the translator returns the target text to the project manager who performs QA on the target text (including, for instance, checking whether formatting and layout of the target text correspond to that of the source text), finalizes the project (including update of the TM) and delivers the target text to the client. Many of the projects were multilingual, i.e. the source text was translated into many different languages with a corresponding increase in the number of translators and reviewers involved and in the number of target texts that the project manager had to handle and deliver. According to one of the project managers, 95% of the assignments at TextMinded at the time of data collection included *tandem translation*.²²

Often, however, projects required different workflows and thus contained other elements. Examples of these are marked by light grey in Figure 12. Generally, the workflows were client-specific in the sense that the different clients had different expectations as to the phases a project should go through. For many clients, the workflow also included DTP, i.e. the creation of publications in a particular layout, for instance in Adobe InDesign. This was typically the case for high-profile marketing jobs. When the translation tasks included DTP tasks, the source text was usually also received in layout. Therefore, the source text first had to be extracted for use in the CAT tool, after which the project manager prepared the project and sent it to the translator and the reviewer. After the *tandem translation* phase, the target text was then typeset in the layout and then typically reviewed again, either by the client or by a reviewer from TextMinded. When the reviewer had changes to make, the department handling the DTP tasks needed to implement these and then the reviewer needed to check the target text again. This stage would repeat until everybody was satisfied. Then the project manager would perform QA on the target text, finalize the project and deliver the target text to the client. The workflows applied in translation projects for Bang & Olufsen, the client from which the source texts used in the experimental study originated, were typically of a complex nature, mostly including DTP tasks and review in layout, with the review performed either by TextMinded (typically the case in projects involving technical texts) or by Bang & Olufsen (typically the case in projects involving marketing texts). Projects for Bang & Olufsen always included *tandem translation*.

²¹ As explained in Section 4.3.1.1.3.1.2, SDL Trados Studio 2011 was the primary CAT tool at TextMinded at the time of data collection. However, other CAT tools such as Memsource, Across and Catalyst were used for specific projects.

²² TextMinded also worked with a "Core Translation" workflow in which the target text was not reviewed after translation. This workflow was not very frequent, but applied when, for example, clients specified that the target text "only" needed to be translated (and not reviewed) or when the client's deadline did not permit review. In any case, when the Core Translation workflow was applied, this was agreed with the client beforehand.

Other (not illustrated) variations of the workflow included situations where the source text was not received at once, but where parts of the source text were delivered to TextMinded in smaller chunks. This resulted in, for example, the DTP department having to extract text from the new file, the project manager having to update the project in the project management system and joining all parts of the text to a complete target text after *tandem translation*. Also, the project managers sometimes had to change the file format of the source text or even “create” the source text when clients only sent the source text pasted into an e-mail. At times, the source text also had to be translated into an intermediate language before it could be translated into the languages the client needed, and sometimes the source text had to be copywritten before it was translated. These and many other factors caused changes to the standard tandem workflow. Thus, Figure 12 should not at all be understood as an illustration of all the possible alternative paths projects could take; as one of the project managers stated: “you can create a nice and neat workflow, but almost always something causes changes”.

As mentioned above, the project management system had a central role in preparing each project, and in storing information about projects, clients, translators and reviewers, for instance about agreed prices paid by clients and paid to external translators and reviewers. As observed by Risku et al., the project management system seemed to have “an almost omnipresent role and is used to log and process virtually all projects” (Risku, Rossmannith, et al. 2013, p.41). Project managers orchestrated many projects in parallel, each involving many different people and programs. This ties in with O’Brien’s statement that “[n]ot only has translation become a HCI task, but so has the task of running a translation business” (O’Brien 2012, p.105).

5.1.3 The translators: Individual differences

The eight translators who participated in the experimental study were briefly described in Section 4.3.1.1.3.1.1. As stated in Section 4.3.1.1.3.1.3, although my aim was to choose source texts and a language direction where the translators had similar qualities and experience, it was impossible to identify a client, language direction and two text types where the translators had exactly the same amount of experience. Apart from these factors, the translators also had different degrees of experience with MT, although none of them had extensive experience. In this section, I shall describe these differences since they are relevant for the interpretation of the results. In doing so, I draw on the data provided by the translators in the post-experimental questionnaire (cf. Appendix 4).

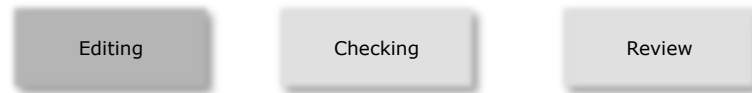
Translator	Typical translation direction	Experience with Bang & Olufsen	Experience with text types	Experience with MT
A	DA→ENG	Limited	Yes	Yes, 4-5 tasks
B	ENG→DA	Yes	Yes	Yes, for a short period
C	DA→ENG	Limited	Limited	Yes, a couple of tasks
D	DA→ENG	No	Yes	Limited
E	ENG→DA	No	Not with FAQ, limited with Newsletter	No
F	ENG→DA / DA→ENG	Yes	Yes	Yes
G	ENG→DA / DA→ENG	Yes	Yes	No
H	ENG→DA / DA→ENG	Limited	Yes	Yes, 3-4 tasks

Table 6. Individual differences between translators

In the questionnaire, the translators were asked to indicate which language direction they worked with the most, second most etc. In Table 6, their most frequent language direction is indicated. However, probably due to a vague phrasing of the question, in the questionnaires completed by Translators F and G, it is not clear whether translation from English into Danish or from Danish into English was their most frequent direction. Translator H indicated that half of the time, she translated from English into Danish, and the other half of the time from Danish into English. Translators A, C and D indicated that their most frequent language direction was Danish into English, whereas Translators B and E mostly translated from English into Danish. The translators were also asked whether they had experience of translating for Bang & Olufsen. Translators B, F and G answered “yes”, Translators D and E responded with “no” and Translators A, C and H indicated that they had limited experience of translating for this client. When asked whether they had experience of the text types translated in the experiment, Translators A, B, D, F, G and H answered “yes”, although Translator A added that her experience stemmed from translation from Danish into English. Translator C indicated that she had limited experience of the text types, and Translator E answered that she did not have experience of translating FAQs, and that her experience of translating newsletters was limited. In terms of the translators’ experience of MT, Translator F indicated that he did have experience of MT, whereas Translators E and G answered that they did not have any experience. Translators A, B, C and H answered that they had experience of MT, but added that this experience was based on a small number of tasks or a short period of time. Translator D answered that she had limited experience of MT.

These factors might have an impact on the results of the experimental study in the sense that, for example, Translator B, who indicated that English into Danish was his most frequent language direction (the same language direction as in the experiment) and that he had experience of working for the client, with the text types and with MT, must be expected to have a better basis for solving the tasks than, for example, Translator C who usually translated from Danish into English and who had limited experience of the client and the text types, or Translator E who, although she usually translated from English into Danish, did not have experience of the client, the FAQ text type or MT. However, all translators typically translated to and from English and Danish (not other languages), and all had some experience (of the client, text types and/or MT) which they might benefit from during the experiment. Individual differences between the translators and their potential impact on the

results will be mentioned in the analyses where relevant and are taken up again in the discussion section in Chapter 6.



5.2 Accept/Reject/Revise: Introduction

RQ1 reads:

1. *To what extent do the translators accept, reject and revise TM and MT matches?*

To investigate this further, the following sub-question RQ1a will be addressed:

- 1a. *How do the translators interact with the MT-assisted TM tool when they accept, reject and revise matches?*

As noted in Chapter 2, when a translator is presented with a match, he or she can choose to accept it as it is, revise it or reject it and instead translate the source text segment from scratch. As a first step in the analysis, the extent to which the translators choose to accept, reject or revise the provided TM and MT matches (RQ1) will be investigated. Next, these choices are investigated in more detail by exploring the nature of the translators' interaction with the MT-assisted TM tool in the three categories *accept*, *reject* and *revise*, i.e. I shall investigate what the translators actually do when they accept, reject or revise a match (RQ1a). In Bundgaard et al. (2016), we conducted a similar analysis of one of the translators' translation processes, but to my knowledge, no other analyses of this type have been conducted in previous studies of MT-assisted TM translation.

The investigation of RQ1 and RQ1a draws primarily on the screen recording files and to a lesser extent on the keystroke logging files and the transcribed retrospective interviews.

5.2.1 Analytical method

The investigation of RQ1 and RQ1a is based on a process analysis of each of the translators' processes from the experimental study (i.e. seven translations of the FAQ text and seven translations of the Newsletter). For each translator, based on the screen recordings, the process when editing each segment in the two texts (the FAQ text and the Newsletter) was described qualitatively. Also, for each segment, the segment number, match type, source text segment, wording of provided match and final translation of the segment were noted. If the translator revisited a segment during the translation process, the process during this revisit was described as well. The keystroke logging files were used for crosschecking the process observed in the screen recordings. After this qualitative description of each

translator's two translation processes, the following criteria were used to determine whether each match was accepted, rejected or revised:

If the translator makes no modifications in the match and the final translation is thus equal to the proposed match, the segment is categorized as belonging to the **ACCEPT** category

If the translator deletes the entire match without having modified it beforehand, the segment is categorized as belonging to the **REJECT** category

If the translator modifies the proposed match, the segment is categorized as belonging to the **REVISE** category

In line with the categorization in Bundgaard et al. (2016), segments belonging to the *revise* category were further categorized as belonging to either the *match-internal* or the *match-external* subcategory, based on the following criteria:

If the translator revises the match without making use of any other resources or functionalities than the proposed match itself, the match is categorized as **MATCH-INTERNAL**

If the translator makes use of one or more resources or functionalities that are external to the match during the revision of the match, the match is categorized as **MATCH-EXTERNAL**

The use of the AutoSuggest function in SDL Trados Studio is categorized as a match-internal activity, since these suggestions are provided automatically while translators type, whereas concordance searches, termbase searches, Google searches, dictionary consultations and the like are categorized as match-external actions, since these are activities actively employed by translators. All match-external actions were registered during the process analysis and categorized inductively.

Following from the established categorization criteria, the editing phase entails the translator choices illustrated in Figure 13. Thus, during the editing phase, in each TM or MT match, the translators can make the choice to *accept*, *reject* or *revise* the match.

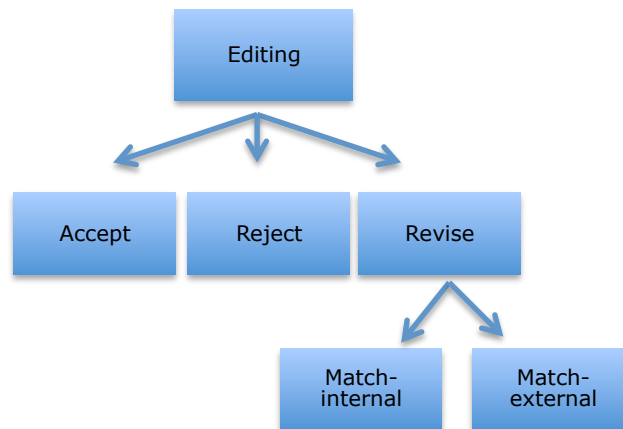


Figure 13. Translator choices in the editing phase

As part of exploring the translators' interaction with the MT-assisted TM tool, the process analyses were triangulated with the retrospective interviews conducted with each of the translators after the experiment. By listening to the audio files of the retrospective interviews while reading the transcriptions of the interviews and the process analysis in parallel, comments made by translators relating to specific segments were added to the process analysis.

5.2.1.1 Limitations

From the screen recording files it is possible to identify what translators did at which times during the translation process. However, as noted in Section 3.3.2, screen recording does not provide information as to which part of the screen the translators are focusing on and, as is the case with keystroke logging (Saldanha & O'Brien 2013, pp.135–136), we do not have access to the translator's thoughts. Thus, the process analysis focuses on the translators' *observable* processes. This also means that, for example, although a translator might have looked at information outside the match (for example an automatically displayed termbase entry), I could only categorize a match as match-external if it was observed in the translation processes that the translator had made use of resources or functionalities external to the match. As to the retrospective interviews, as described in Section 3.3.2, there is a risk that translators may have forgotten (parts of) the translation processes and that they infer missing information or generalize incomplete memories. Also, the problem pertaining to automaticity is relevant here since all of the translators had several years of experience. However, the integration of MT was relatively new to the translators, which may have made the translators more conscious of their translation processes.

5.2.2 Results

The results of the analyses that address RQ1 and RQ1a are presented in this section. RQ1 is answered in Section 5.2.2.1, and, by going further into depth with the characteristics of the translators' interaction with the tool in the *accept*, *reject* and *revise* categories, RQ1a is answered in Section 5.2.2.2. In all sections, results are presented for both the FAQ text and

the Newsletter with a focus on the different match types (70-74%, 75-84%, 85-94%, 95-99%, 100%, CM and MT matches). Particular attention will be paid to discussing differences and similarities between the results for TM matches with low match values and MT matches, since, as described in Section 2.4, the TM/MT threshold is an important topic of discussion in research on CAT and in translation practice. In each section, I will also comment on individual differences between the translators. Furthermore, for each category, the translators' interaction with the MT-assisted TM tool will be illustrated through step-by-step process examples, based on the process analysis. These examples are supplemented by the comments made by the translators in the retrospective interviews. Throughout the section, italicized back translations (BT) are provided in parentheses after Danish words. Finally, the section is rounded off with a synthesis and discussion of the results in Section 5.2.3.

5.2.2.1 Accept/Reject/Revise: Distribution

For the **FAQ** text, the distribution of the matches into the three categories *accept*, *reject* and *revise* is shown in Table 7 for each translator and in Table 8 for all translators combined.

Match type	No. of matches in text	Translator H					
		Accept		Reject		Revise	
CM	2	2	100%	0	0%	0	0%
100%	28	25	89%	0	0%	3	11%
95-99%	4	1	25%	0	0%	3	75%
85-94%	6	0	0%	3	50%	3	50%
75-84%	3	0	0%	0	0%	3	100%
70-74%	3	0	0%	1	33%	2	67%
MT	30	2	7%	0	0%	28	93%
In total	76	30	39%	4	5%	42	55%

Table 7. Accept/reject/revise for each translator - FAQ text

Match type	Total no. of matches in text	All translators					
		Accept		Reject		Revise	
CM	14	14	100%	0	0%	0	0%
100%	196	184	94%	0	0%	12	6%
95-99%	28	12	43%	2	7%	14	50%
85-94%	42	0	0%	23	55%	19	45%
75-84%	21	1	5%	1	5%	19	90%
70-74%	21	0	0%	6	29%	15	71%
MT	210	19	9%	26	12%	165	79%
In total	532	230	43%	58	11%	244	46%

Table 8. Accept/reject/revise for all translators - FAQ text

Tables 7 and 8 show that the two CM matches were accepted by all translators, which was also to be expected since these are 100% matches that occur in the same context as the segment stored in the TM. As shown in Table 8, the 28 100% matches were generally accepted (94%) by the translators. The remaining 100% matches were revised (6%), i.e. no 100% matches were rejected. Table 7 shows that Translators B and E accepted all 28 (100%), Translators A and C accepted 27 (96%) and Translators G, H and D accepted 26 (93%), 25 (89%) and 23 (82%), respectively. The four 95-99% matches were mostly revised (50%) or accepted (43%) and on a few occasions rejected (7%). Table 7 shows that the individual translators' choices were quite different here; for example, Translator B accepted all four 95-99% matches, whereas Translator D revised all four. The 6 matches in the 85-94% match category were mostly rejected by the translators (55%). Considering that all other TM match types were far less frequently rejected, this was a bit surprising. However, an explanation can be found in the experimental setup, as will be explained in Section 5.2.2.2. The remaining 85-94% matches were revised (45%), i.e. no 85-94% matches were accepted. The individual translators' choices were quite similar here: of the six matches within this match type, Translators A, B, D, G and H all rejected three and revised three, and Translators C and E rejected four and revised two of the matches. The three 75-84% matches were mostly revised (90%) by the translators. Translator B accepted one 75-84% match and Translator C rejected one, but apart from that, all 75-84% were revised. The translators also mostly revised the three 70-74% matches (71%). The matches that were not revised were rejected (29%). All translators except Translator A (who revised all three matches) revised two of the 70-74% matches and rejected one. The 30 MT matches were mostly revised (79%). The remaining MT matches were rejected (12%) or accepted (9%). Thus, in 9% of the cases where the translators were offered an MT match, they accepted it without modifications. Differences in the translators' choices were observed here. Translators C, E, G and H each accepted two MT matches, Translators A and B accepted three and Translator D accepted five matches. Translators A and H did not reject any MT matches, whereas Translators G, B, C, D and E rejected one, four, six, seven and eight MT matches, respectively.

Figure 14 shows the percentages of matches that were accepted, rejected and revised in each match type and by all translators in total. From the figure it is clear that fuzzy matches with higher match values were the match types that were most frequently accepted, and that fuzzy matches with lower match values and MT matches were the match types that were most frequently revised. Apart from the high percentage of 85-94% matches that were rejected (as noted above), 70-74% and MT matches were the match types most frequently rejected.

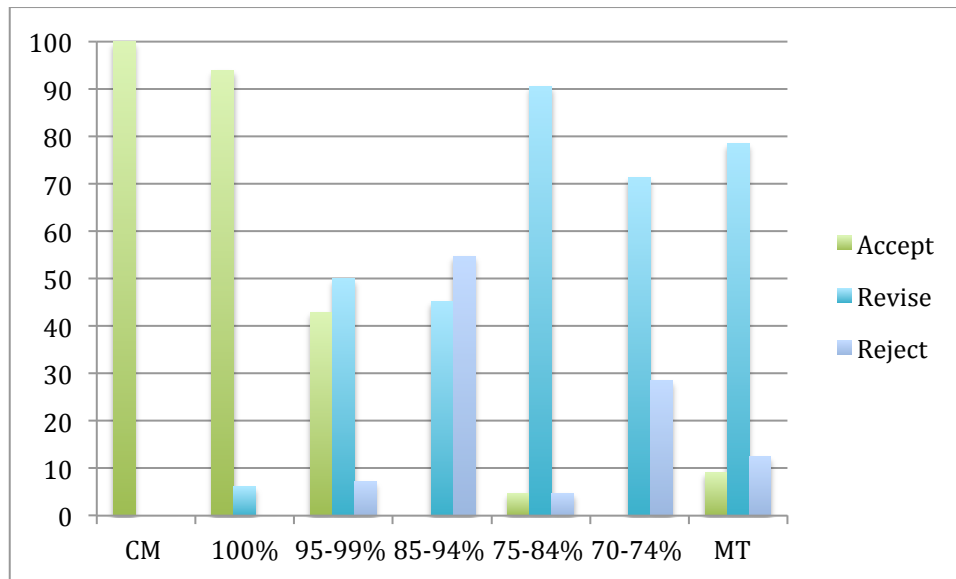


Figure 14. Accept/reject/revise for match types and all translators - FAQ text

Regarding the TM/MT threshold, it is interesting to observe that the translators rejected 29% of the 70-74% matches compared to 12% of the MT matches. Since intuitively we would expect translators to reject matches of a low quality, this might indicate that the translators find that the 70-74% are of a lower quality and thus less worth revising than MT matches. However, the amount of data in the 70-74% category is quite low, and, as will be explored further in Section 5.2.2.2, the 6 rejected 70-74% matches involve six translators rejecting the same 70% match.

For the **Newsletter**, Tables 9 and 10 show the distribution of the matches into the categories *accept*, *reject* and *revise* for each translator and for all translators, respectively. As shown in Table 9, all translators but one (Translator H) accepted the one 100% match (100%), and the one 95-99% match was revised by all translators (100%). The two 85-94% matches were mostly revised (79%) by the translators, although three translators (B, G and H) each accepted one of the matches (21%). Six of the seven translators revised all five 75-84% matches (94%), and Translator G rejected two of the five matches, which equals 6% of the total number of 75-84% matches. The three 70-74% matches were revised by six of the seven translators (95%). Translator C accepted one 70-74% match, which equals 5% of the total number of matches in this match type. The translators mostly revised the 13 MT matches in the Newsletter (93%). Two MT matches were rejected in total (2%) (Translators B and E each rejected one MT match) and four were accepted (4%) (Translators E and G each accepted two MT matches). Thus, in 4% of the cases where the translators were offered an MT match in the Newsletter, they accepted it without modifications.

Match type	No. of matches in text	Translator A						Translator B						Translator C					
		Accept		Reject		Revise		Accept		Reject		Revise		Accept		Reject		Revise	
100%	1	1	100%	0	0%	0	0%	1	100%	0	0%	0	0%	1	100%	0	0%	0	0%
95-99%	1	0	0%	0	0%	1	100%	0	0%	0	0%	1	100%	0	0%	0	0%	1	100%
85-94%	2	0	0%	0	0%	2	100%	1	50%	0	0%	1	50%	0	0%	0	0%	2	100%
75-84%	5	0	0%	0	0%	5	100%	0	0%	0	0%	5	100%	0	0%	0	0%	5	100%
70-74%	3	0	0%	0	0%	3	100%	0	0%	0	0%	3	100%	1	33%	0	0%	2	67%
MT	13	0	0%	0	0%	13	100%	0	0%	1	8%	12	92%	0	0%	0	0%	13	100%
In total	25	1	4%	0	0%	24	96%	2	8%	1	4%	22	88%	2	8%	0	0%	23	92%

Match type	No. of matches in text	Translator D						Translator E						Translator G					
		Accept		Reject		Revise		Accept		Reject		Revise		Accept		Reject		Revise	
100%	1	1	100%	0	0%	0	0	1	100%	0	0%	0	0%	1	100%	0	0%	0	0%
95-99%	1	0	0%	0	0%	1	100%	0	0%	0	0%	1	100%	0	0%	0	0%	1	100%
85-94%	2	0	0%	0	0%	2	100%	0	0%	0	0%	2	100%	1	50%	0	0%	1	50%
75-84%	5	0	0%	0	0%	5	100%	0	0%	0	0%	5	100%	0	0%	2	40%	3	60%
70-74%	3	0	0%	0	0%	3	100%	0	0%	0	0%	3	100%	0	0%	0	0%	3	100%
MT	13	0	0%	0	0%	13	100%	2	15%	1	8%	10	77%	2	15%	0	0%	11	85%
In total	25	1	4%	0	0%	24	96%	3	12%	1	4%	21	84%	4	16%	2	8%	19	76%

Match type	No. of matches in text	Translator H			
		Accept		Reject	Revise
100%	1	0	0%	0	0%
95-99%	1	0	0%	0	0%
85-94%	2	1	50%	0	0%
75-84%	5	0	0%	0	0%
70-74%	3	0	0%	0	0%
MT	13	0	0%	0	0%
In total	25	1	4%	0	0%

Table 9. Accept/reject/revise for each translator - Newsletter

Match type	Total no. of matches in text	All translators			
		Accept		Reject	Revise
100%	7	6	86%	0	0%
95-99%	7	0	0%	0	0%
85-94%	14	3	21%	0	0%
75-84%	35	0	0%	2	6%
70-74%	21	1	5%	0	0%
MT	91	4	4%	2	2%
In total	175	14	8%	4	2%

Table 10. Accept/reject/revise for all translators - Newsletter

Figure 15 shows the percentages of matches which were accepted, rejected and revised in each match type by all translators in total. From the figure, we see that 100% matches were mostly accepted, whereas all other match types were mostly revised. 75-84% and MT matches were the only match types which were rejected.

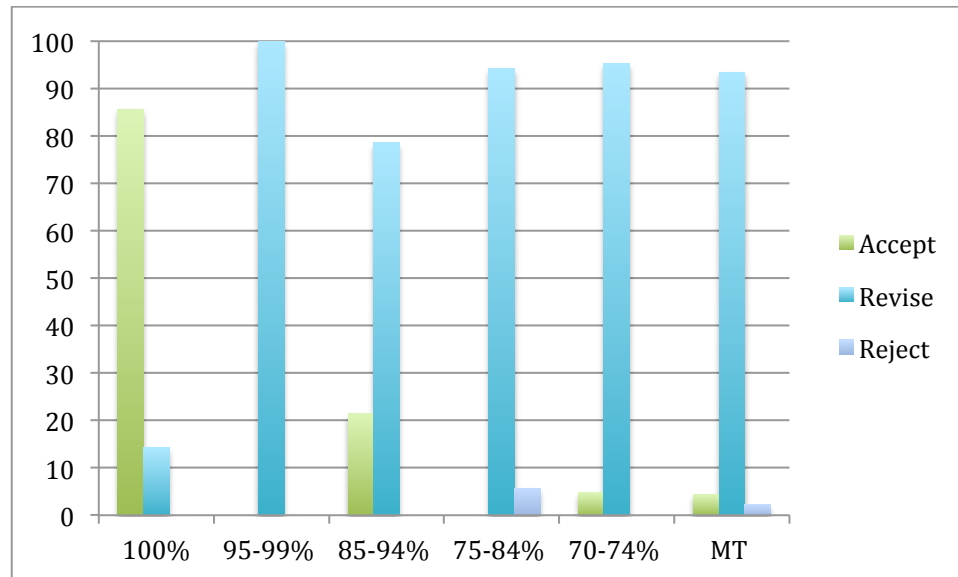


Figure 15. Accept/reject/revise for match types and all translators - Newsletter

Regarding the TM/MT threshold, there are only small differences between the translators' choices in 70-74% and MT matches (and 75-84%, for that matter). When only seen from the viewpoint of the categorization into *accept*, *reject* and *revise*, this might indicate that these fuzzy match types and MT matches are comparable. However, this needs to be seen in the light of other results such as editing speed in these match types.

5.2.2.2 Accept/Reject/Revise: Characterizing the interaction

In this section, the translators' interaction with the MT-assisted TM tool is analyzed in order to answer RQ1a. Hence, the translators' interaction with the tool is analyzed for each of the three categories, *accept*, *reject* and *revise* and for the *revise* category, for the *match-internal* and *match-external* subcategories. In the section related to each category, i.e. in Sections 5.2.2.2.1, 5.2.2.2.2 and 5.2.2.2.3, the different match types are taken as the point of departure for producing an overview of the characteristics of the translators' interaction with the tool in both the FAQ text and the Newsletter. Furthermore, the translators' interaction with the tool is illustrated by means of process examples, i.e. examples of specific translators' processes when editing specific matches. These process examples are based on the process analysis of all segments, and the processes will be described in a step-by-step manner, illustrating the translators' actions in selected segments reflecting all three categories, i.e. *accept*, *reject* and *revise*. The process examples are not meant to provide the basis for a comparison of the translation processes in the two texts. Rather, the purpose of the examples is to provide qualitative insights into individual translators' interactions with the MT-assisted TM tool. In the selection of segments, priority was given to segments on which the translators commented during the interviews, since these comments may shed

further light on the translators' actions. Priority was also given to selecting segments from each of the seven translators, where at least one example from each translator is provided.

5.2.2.2.1 The *accept* category

As shown in Table 8, in the **FAQ** text, 230 matches were accepted in total. The decision that a match is acceptable as it may be based on the translator's own evaluation of the match; alternatively, he or she may find it necessary to carry out research to verify the proposed match. In four of the 230 matches which were accepted in the FAQ, the translators carried out observable actions (B14²³, B25, G66 and H14), seemingly to verify the proposed match prior to accepting it. In three of these cases, the translators carried out a concordance search (B14, G66 and H14) and in the fourth case, the translator carried out a termbase search (B25) before accepting the matches. Thus, when translators accepted proposed matches, they were typically able to do it without carrying out any observable research.

As explained in the previous section, all CM matches (100%) and most 100% matches (94%) were accepted by the translators. This is not surprising since these are matches for which an identical source segment was found in the TM. However, the analysis revealed that, unintentionally, two of the 100% matches contained an endophoric deictic reference which was not appropriate for the target text.²⁴ The two matches read as shown in Table 11.²⁵

Segment number	Match type	Source text segment	Match
28	100%	Shown by light grey areas in the illustration.	Dette viser de lysegrå områder i illustrationen ovenfor . BT: This show the light grey areas in the illustration above .
31	100%	Shown by medium grey areas in the illustration.	Dette viser de mellemgrå områder i illustrationen ovenfor . BT: This show the medium grey areas in the illustration above .

Table 11. Accepted 100% matches - Examples: Segments 28 and 31 - FAQ text

The matches stored in the TM said that the illustration which is referred to appeared "ovenfor" (*above*) the two sentences. However, in the FAQ text which the translators had to translate in the experiment, the illustration appeared *below* the two sentences. The location of the illustration was visible to the translators in the reference text (containing the fully formatted source text) which they received together with the translation files (cf. Appendix 5). The translator whose translations are stored in the TM must have introduced the adverb "ovenfor" (*above*) in the Danish translations of the source segments although the source text did not contain any reference to the location of the illustration. This was possibly done to help the reader of the target text, but when the translations are retrieved for a new translation, a new translator might not notice that the deictic reference is not adequate in the new context, since he or she is offered a 100% match. In fact, in the experiment,

²³ These abbreviations refer to the translator and the segment, here Translator B's process when editing segment 14.

²⁴ The same was the case for the match in segment 34, a 99% TM match.

²⁵ In the examples of segments from the FAQ text which I provide in Sections 5.2.2.2.1 and 5.2.2.2.2, the text is formatted in the way it was displayed to the translators. Since the translators had different settings in SDL Trados Studio concerning the display of tags indicating formatting (cf. Section 4.3.1.1.3.1.4.2), these are not included in the examples. Tags indicating the presence of a visual element are included since all translators had these displayed in SDL Trados Studio.

Translators A, B, C, E and G did not notice this and left “ovenfor” in the target text, which might cause confusion for the target reader. Translators D and H, by contrast, deleted “ovenfor” in both segments. It is visible in the screen recording that Translator H checked the reference text upon entering segment 28 and thus probably noticed that “ovenfor” was not appropriate (Translator H’s process when editing segment 28 is exemplified in Section 5.2.2.2.3.3.2, example 24-FAQ-H-28). Interestingly, Translator D only entered the reference text before editing any of the matches, scrolled a bit in it, but did not reach the relevant part of the text. Since the translator did not return to it during the translation process and thus cannot have noticed that the illustration was below, and not above, the illustration, the translator chose to delete “ovenfor” in the sentences without knowing the location of the illustration. It may be that Translator D noticed that the deictic reference was not present in the source text and/or that she tends to delete such references in order to increase the recyclability of matches (cf. Section 2.3). The fact that the remaining five translators left “ovenfor” untouched in the provided matches is interesting in light of the hypothesis that translators no longer approach translation as a holistic process, but translate segment by segment, thus forgetting about the context (cf. Section 2.3).

12 of the 28 95-99% matches (43%) were accepted by the translators. These are shown in Table 12.

Segment number	Match type	Source segment	Match	Accepted by translator(s)
12	99%	BeoVision 7-40/55	BeoVision 7-40/55. BT: BeoVision 7-40/55.	A, B, G
25	98%	Use the position knob to filter out the natural bass change obtained if the subwoofer is placed, for example, in a corner, as compared to a more freestanding position.	Brug positionsomskifteren til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit. BT: Use the position switch to filter out changes in the bass reproduction as a result of the subwoofer e.g. being placed in a corner instead of freely.	B
34	99%	Shown by the dark grey areas in the illustration.	Det er vist med de mørkegrå områder i illustrationen ovenfor. BT: This is shown with the dark grey areas in the illustration above.	A, B, C
35	95%	The positions mentioned are guidelines only.	Disse positionsindstillinger er dog kun anbefalinger – BT: These position settings are only guidelines –	B, C, E, G, H

Table 12. Accepted 95-99% matches - FAQ text

In segment 12, the only difference between the source segment and the source segment in the TM is the full stop. It is probable that Translators A, B and G did not notice this difference or deemed it insignificant. In segment 25, the source segment in the TM said “Use the position *switch*”, whereas the source segment in the source text said “Use the position *knob*”. This difference made the match value drop to 98%. However, Translator B accepted the translation into “positionsomskifteren” (*position switch*). As for the source segment in 34, two exact matches were retrieved from the TM, and for this reason, a penalty of 1% had been applied to the match, resulting in a 99% match (SDL 2016). Thus, the match should be

an acceptable translation, and it was accepted by Translators A, B and C.²⁶ The only difference between the source segment in segment 35 and the source segment in the TM was that “guidelines” was spelled “guide lines” in the segment stored in the TM. This has no influence on the Danish translation which is spelled “anbefalinger” regardless of the spelling in the source text.

One match from the 75-84% match category was accepted, namely the 75% match provided in segment 36, shown in Table 13. This match was accepted by Translator B.

Segment number	Match type	Source segment	Match	Accepted by translator(s)
36	75%	You may set the position knob to any position depending on your sound preference.	du kan frit indstille omskifteren, som du foretrækker. BT: you may freely set the switch as you prefer.	B

Table 13. Accepted 75-84% match - FAQ text

The segment stored in the TM read as follows (differences with the source segment in the text translated in the experiment are marked in bold): “You may set the **POS switch** to any **of the three positions** depending on your sound preference.” In the provided match, the translator who translated the original source segment seems to have, using Schjoldager’s (2010) terminology, used a microstrategy of condensation by leaving out “POS” and “of the three positions”. Translator B had previously translated “position knob” into “positionsomskifteren” and could thus accept a condensed translation of “position knob” into “omskifteren” (*the switch*), since it was clear from the context that it referred to “positionsomskifteren”. Also, the original translator’s condensed translation of “you may set [...] to any of the three positions” into “du kan frit indstille” (*you may freely set*) was acceptable to Translator B since it was clear from the context what was referred to.

19 MT matches were accepted without modifications (9%), i.e. in 19 cases, the MT engine provided the translators with acceptable translations. These are visible from Table 14.

Segment number	Source segment	MT match	Accepted by translator(s)
5	PL- A (PL1)	PL- (PL1) BT: PL- (PL1)	A, D
6	PL-B (PL2)	PL-B (PL2) BT: PL-B (PL2)	A, B, C, D, E, G, H
14	TVs with Din Power Link sockets:	Fjernsyn med DIN Power Link stik : BT: Television with DIN Power Link sockets:	B, H
66	Placement of the indicator light.	Placering af indikatorlampe. BT: Placement of indicator light.	A, B, C, D, E, G
68	Is the surround sound processor integrated in BeoLab 14 ?	Er surroundsound-processor integreret i BeoLab 14 ? BT: Is surround sound-processor integrated in BeoLab 14 ?	D
73	How do I clean my BeoLab 14 and the satellites?	Hvordan rengør jeg mit BeoLab 14 og satellitterne? BT: How do I clean my BeoLab 14 and the satellites?	D

Table 14. Accepted MT matches - FAQ text

²⁶ This match contained an inadequate deictic reference to the illustration similar to the matches in segments 28 and 31 mentioned above.

Two translators (A and D) accepted the match in segment 5 even though a capital “A” is missing in the match. Translator D corrected this during the checking phase, whereas Translator A handed in the translation without correcting it. All translators accepted the match in segment 6, which was an acceptable direct transfer (Schjoldager 2010) of the source segment to the target segment, and Translators B and H accepted the match in segment 14, which was a direct and acceptable translation, although it is regarded as a standard norm in Danish to insert a hyphen between a group of words (here, *DIN Power Link*) when combining it with a noun (*stik*) to form one noun (*DIN Power Link-stik*). All translators except Translator H accepted segment 66 which is an acceptable translation of the source segment. Interestingly, Translator H added an “n” to “indikatorlampe”, changing it from the indefinite to the definite form, but then deleted the “n” again. According to the categorization criteria, this made the segment belong to the *revise* category, however, the translation ended up being identical to the proposed match. Translator D was the only one to accept segments 68 and 73. Translator D’s process in segment 68 is exemplified below (Example 2-FAQ-D-68) and is thus not commented on further here. The match in segment 73 is an acceptable translation of the source text segment.

As shown in Table 10, in the **Newsletter**, 14 matches were accepted in total. In three of these matches, a concordance search was carried out before the match was accepted (E1, E25 and G10), seemingly to verify the proposed matches. The remaining 11 matches were accepted without any observable research. 6 of the 7 translators accepted the one 100% match in the Newsletter, shown in Table 15.

Segment number	Match type	Source segment	Match	Accepted by translator(s)
20	100%	An unswerving dedication to craftsmanship beyond the ordinary.	Et kompromisløst og exceptionelt engagement inden for håndværksmæssig kvalitet. BT: An uncompromising and exceptional commitment within craftsman-related quality.	A, B, C, D, E, G

Table 15. Accepted 100% matches - Newsletter

Three 85-94% matches and one 70-74% match were accepted by the translators, shown in Table 16.

Segment number	Match type	Source segment	Match	Accepted by translator(s)
3	94%	Bang & Olufsen has announced a new partnership with Spotify, the world’s leading music streaming service.	Bang & Olufsen har indgået et samarbejde med Spotify, verdens førende udbyder af musikstreaming. BT: Bang & Olufsen has entered into a partnership with Spotify, the world’s leading provider of music streaming.	B, G, H
19	73%	The one commitment that binds all three partners?	Hvad binder dem sammen? BT: What binds them together?	C

Table 16. Accepted 85-94% and 70-74% matches - Newsletter

The source segment stored in the TM for segment 3 read “Bang & Olufsen *announces*”, whereas the source segment in this text read “Bang & Olufsen *has announced*”. However, in

the match, the present perfect was used (“har indgået” – *has announced*) and was thus acceptable to Translators B, G and H. In segment 19, the source text segment in the TM read “The one commitment that binds them all?”. Translator C chose to accept the translation “Hvad binder dem sammen?” (*What binds them together*), which may be described as a condensed (Schjoldager 2010) translation of the source segment, as it leaves out the “three partners”.

Four of the 91 MT matches were accepted, shown in Table 17.

Segment number	Match type	Source segment	Match	Accepted by translator(s)
1	MT	BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept	BeoSound 5 nu med Spotify Bang & Olufsen lancerer næste generations lydsystem BT: BeoSound 5 now with Spotify Bang & Olufsen launches next generation's sound system	E
10	MT	Bang & Olufsen has just announced an all-new design concept for its stores.	Bang & Olufsen har for nylig annonceret et helt nyt koncept for sine butikker. BT: Bang & Olufsen has recently announced a whole new concept for its shops.	G
14	MT	Other Bang & Olufsen stores in major cities worldwide will be updated beginning later in 2013.	og i løbet af året opdateres andre Bang & Olufsen butikker i større byer verden over. BT: and during the year other Bang & Olufsen stores in major cities worldwide will be updated.	G
25	MT	Enjoy more of BeoPlay V1	Se mere om BeoPlay V1 BT: See more about BeoPlay V1	E

Table 17. Accepted MT matches - Newsletter

Only Translators E and G accepted any MT matches. Translator E left “lydsystem” (*sound system*) in segment 1 even though this does not seem to be an acceptable translation of “retail concept”. Translator E’s process when translating segment 1 is elaborated upon in the examples section below (Example 3-NL-E-1). Translator G accepted segment 10, leaving out “design” in the translation of “design concept”. Translator G accepted segment 14 despite the lowercase initial letter. This, however, is explained by the fact that Translator G wrote segments 13 and 14 so that they appeared in the target text as one sentence (segment 13 ending with a comma, and segment 14 starting with “og” (*and*)). This is interesting in the context of the disadvantages of TM mentioned in Section 2.3, since in this case, Translator G deviated from the sentence structure in the source text. Finally, Translator E accepted the match in segment 25, which seems to be an acceptable translation of the source text segment.

5.2.2.2.1.1 Process examples

The process examples follow a developed template (illustrated below). In the top part of the template, the translator whose process is exemplified, is indicated together with the segment number, match type, categorization into *accept*, *reject* or *revise*, and for the *revise* category, it is indicated whether it was a *match-internal* or *match-external* revision. In the far right column of the top part, the source text segment is given. For the matches

categorized as match-external revision, the match-external actions used are indicated below this heading. Next, based on the process analysis, the process description is given, divided into steps. For every step, an interim target segment is shown, making it possible to follow the unfolding of the translation, starting in each case with the wording of the provided match and ending with the translation of the segment as it appeared after the editing phase. In the interim target segment, changes made in the current step are marked by grey shading. In the source text segment and the interim target segment, formatting and tags are shown in the way the particular translator had these displayed; this is in line with the purpose of the process examples, namely to provide qualitative insights into individual translators' interactions with the tool. BTs are provided for the first interim target segment (the match). Lines are broken in the BTs to make them more comparable to the Danish sources. In the right column, the lines from the interview transcript pertaining to the particular step are provided. "N/A" signifies that the segment was not discussed during the interview. In the explanatory text accompanying each process example, the process is described in a condensed manner. Appendix 6 includes the examples in a different format than the template used here. The format used in Appendix 6 was the analytical tool, which I used in this analysis, which also contained the relevant parts of the interviews (in Danish, however).

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Match-external actions:					
Steps	Process description	Interim target segment			Interview
1	Wording of provided match	Match BT:			
2					
3					
(...)		Translation as it appeared after the editing phase			

If the translator left the exemplified segment and returned to it later in the process (during the editing phase), this is marked in the template in the form of a bold line between the steps (exemplified between steps 2 and 3). If changes were made to the exemplified segment during the checking phase, this will be mentioned in the explanatory text accompanying each example. The examples are numbered sequentially (from 1 to 26) and carry the abbreviation for the text (FAQ or NL), the translator's letter (e.g. B) and the segment number (e.g. 14).

In the following, two process examples from both the FAQ text and the Newsletter are provided for the *accept* category.

Example 1-FAQ-B-14:

When discussing the FAQ text in the retrospective interviews, we talked in one case only about an accepted segment, namely Translator B's translation of segment 14. This was also one of the segments in which the translators carried out a concordance search before accepting the match.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator B	14	MT	Accept	N/A	TVs with Din Power Link sockets:
Steps	Process description	Interim target segment			Interview
1	Wording of provided match	Fjernsyn med DIN Power Link stik : BT: Television with DIN Power Link sockets:			App. 6, B, ll. 138-140
2	Selects "Power Link" in the source segment and runs a concordance search.	Fjernsyn med DIN Power Link stik :			
3	Returns to this segment again after having made a change in segment 9. Confirms the segment.	Fjernsyn med DIN Power Link stik :			

The concordance search in step 2 did not cause the translator to change anything in the match, which is in line with the translator's comment in the retrospective interview that "I must have thought that it [the match] could be used". After having run the concordance search, the translator returned to segment 9 to delete a hyphen between "Link" and "stik" and then returned to segment 14, confirmed the segment and proceeded.

Example 2-FAQ-D-68:

Another match which was accepted was the match in segment 68, which was accepted by Translator D. This match was accepted without the translator carrying out any observable actions. The match was revised by all the other translators. In doing so, five of the six translators inserted a space between "surround" and "sound", and five of the six added "en" to "processor", changing it to the definite form. Changing "processor" to the definite form is more grammatically correct in Danish (*surroundsound-processoren*), since a certain surround sound processor is meant here; however, the meaning of the sentence also comes across without it.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator D	68	MT	Accept	N/A	Is the surround sound processor integrated in [tag] BeoLab 14 [tag]?
Steps	Process description	Interim target segment			Interview
1	Wording of provided match	Er surroundsound-processor integreret i[tag] BeoLab 14 [tag] ? BT: Is surroundsound-processor integrated in BeoLab 14 ?			N/A

In the checking phase, the translator entered the segment again and deleted the space between the tag and the question mark.

Example 3-NL-E-1:

When discussing the Newsletter in the retrospective interviews, we talked about accepted segments in two cases. The first case related to Translator E's process in segment 1. The translator ran a concordance search for "retail concept" (step 2), which returned no results for that exact term. Interestingly, the translator said in the interview that the match was a bit far away from the source segment and that she had to find out whether it could be used, saying that she decided that it could, at least initially. She thus ended up accepting the match where "retail concept" had been translated into "lydsystem" (*sound system*), although "lydsystem" does not appear to be an adequate rendering of "retail concept". The remaining translators translated "retail concept" into "detailkoncept" (*retail concept*), "butikskoncept" (*store concept*) or "forhandlerkoncept" (*retailer concept*).

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator E	1	MT	Accept	N/A	BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		BeoSound 5 nu med Spotify Bang & Olufsen lancerer næste generations lydsystem BT: BeoSound 5 now with Spotify Bang & Olufsen launches next generation's sound system		App. 6, E, ll. 377-385
2	Selects "retail concept" in the source segment and runs a concordance search.		BeoSound 5 nu med Spotify Bang & Olufsen lancerer næste generations lydsystem		

Later in the interview when I asked Translator E whether she found anything in the translations particularly difficult, the first point that she brought up was that she did not know how to translate "next generation retail concept" in segment 9. She explained that she had translated the same phrase into "næste generations lydsystem" in segment 1, but that judging from the source text something else was meant in segment 9. The other six translators used the same translation in segments 1 and 9, indicating that they did not interpret the phrase differently in the two segments. Had I been aware of this difference during the interview, it would have been interesting to ask Translator E to elaborate on her interpretation.

Example 4-NL-G-10:

Translator G accepted the MT match in segment 10. The translator entered segment 10 after having completed his translation of segment 9, but then returned to segments 1 and 2 and implemented changes (step 2). After this, he entered segment 10 again and ran a concordance search for "design concept" (step 3) before proceeding to segment 11 without making changes in segment 10. In the checking phase, however, he added "design" before "koncept". In the retrospective interview, when asked about this segment, Translator G said that he thought he started out accepting the match, but that he returned to it later and inserted "design" before "koncept". This was in accordance with what could be observed in the screen recording.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator G	10	MT	Accept	N/A	Bang & Olufsen has just announced an all-new design concept for its stores.
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Bang°& Olufsen har for nylig annonceret et helt nyt koncept for sine butikker. BT: Bang & Olufsen has recently announced a whole new concept for its shops.		App. 6, G, ll. 489-496
2	Enters this segment and then returns to segments 1 and 2.		Bang°& Olufsen har for nylig annonceret et helt nyt koncept for sine butikker.		
3	Selects "design concept" in the source segment and runs a concordance search.		Bang°& Olufsen har for nylig annonceret et helt nyt koncept for sine butikker.		

5.2.2.2.2 The *reject* category

As stated in Section 5.2.1, a match is categorized as belonging to the *reject* category if it is deleted without having been modified beforehand. This includes matches which were deleted because the translators used the Copy Source to Target function, by means of which the provided match is deleted and the source segment is inserted in the target segment instead. It also includes TM matches which are deleted because translators choose to replace them with an MT suggestion (cf. Section 4.3.1.1.3.1.2).

Table 18 shows that, in the **FAQ text**, all rejected matches except for one were rejected by means of the translators' use of the Copy Source to Target function. The remaining match was rejected because the translator chose to insert the MT match instead of the proposed TM match. Interestingly, no matches were deleted by "pure" deletion, i.e. where translators deleted the match letter by letter or used the mouse or keyboard to select the match and delete it altogether. This is interesting, because translators are generally expected to translate source segments from scratch if a match is rejected. The present study shows that the translators did not, in fact, translate from scratch when they rejected a match; instead they replaced the match with either the source segment or an MT match and worked with this instead.

Match type	Total number of rejected matches	Copy Source to Target	Insertion of MT match	"Pure" deletion
CM	0	0	0	0
100%	0	0	0	0
95-99%	2	2	0	0
85-94%	23	23	0	0
75-84%	1	1	0	0
70-74%	6	5	1	0
MT	26	26	N/A	0
In total	58	57	1	0

Table 18. Rejection type for all translators - FAQ text

The two 95-99% rejected matches in the FAQ text include one match that was rejected by two translators, shown in Table 19.

Segment number	Match type	Source segment	Match	Rejected by translator(s)
12	99%	BeoVision 7-40/55	BeoVision 7-40/55. BT: BeoVision 7-40/55.	C, E

Table 19. Rejected 95-99% matches - FAQ text

Translators C and E both used the Copy Source to Target function in segment 12. The match contained a full stop which was not part of the source text, and since the translators generally followed the layout of the source text, the translators probably wanted to delete the full stop. However, they may have found it easier to use the Copy Source to Target function here instead of deleting the full stop themselves, since the text in the source segment could be transferred directly to the target text segment and be used as the translation as well.

The 23 rejected 85-94% matches are visible from Table 20.

Segment number	Match type	Source segment	Match	Rejected by translator(s)
26	94%	FREE:	FREE	A, B, C, D, E, G, H
29	94%	WALL:	WALL	A, B, C, D, E, G, H
32	94%	CORNER:	CORNER	A, B, C, D, E, G, H
46	92%	What does the indicator light on BeoLab 14 mean?	Hvad betyder lamperne på Beolit 14? BT: What do the lamps on Beolit 14 mean?	C, E

Table 20. Rejected 85-94% matches - FAQ text

As mentioned in Section 5.2.2.1, it seemed surprising that more than half of the matches in the 85-94% match category were rejected, considering that all other TM match types were far less frequently rejected. However, an explanation might be found in the experimental setup. As described in Section 4.3.1.1.3.1.4.1.2, words which were to remain untranslated in the target text were formatted in red in the source text, and the source text happened to contain three segments with a 94% match value which each contained only one word

marked in red (segments 26, 29 and 32). All seven translators chose to reject these three matches by using the Copy Source to Target function, because the source-text segment could be transferred directly to the target segment and be used as the translation. This accounts for 21 of the 23 rejected 85-94% matches, and the experimental setup therefore appears to have impacted on the results in an unfortunate way in this regard. In the last segment from the 85-94% match category which was rejected, segment 46, “BeoLab 14” was marked in red in the source text, and the match contained a wrong product name (Beolit 14). This may have been the reason why Translators C and E chose to use the Copy Source to Target function in this segment, since in this way, the correct product name was transferred to the target segment together with the rest of the source text segment.

The one rejected 75-84% match was the match in segment 71, rejected by Translator C and shown in Table 21.

Segment number	Match type	Source segment	Match	Rejected by translator(s)
71	80%	For more information, see the Technical Sound Guide .	Du finder flere oplysninger i hurtigvejledningen. BT: You find more information in the quick guide.	C

Table 21. Rejected 75-84% match - FAQ text

“Technical Sound Guide” was marked in red in the source text, and in line with the examples above, this might have been the reason why Translator C used the Copy Source to Target function to reject the match.

The six rejected matches in the 70-74% match category include one 70% match which was rejected by six of the translators, namely the match provided in segment 51 (cf. Table 22). Translators B, C, D, E and H used the Copy Source to Target function in the segment, and Translator G chose to insert the MT match instead of the proposed TM match.

Segment number	Match type	Source segment	Match	MT match inserted instead of TM match	Rejected by translator(s)
51	70%	[tag]A software update in progress:	En optagelse er i gang BT: A recording is in progress		B, C, D, E, H
51	70%	[tag]A software update in progress:	En optagelse er i gang BT: A recording is in progress	En softwareopdatering i gang: BT: A software update in progress:	G

Table 22. Rejected 70-74% matches - FAQ text

The source segment in segment 51 contained a tag indicating the presence of a visual element which was not present in the match. By using the Copy Source to Target function, the tag was transferred to the target segment, which may have motivated Translators B, C, D, E and H to use this function. After using the Copy Source to Target function, the translators edited the source segment (which was now in the target segment) so that it was changed to a Danish translation. Interestingly, after Translator G inserted the MT match (which like the 70% TM match also did not contain the tag) into the target segment, he copied “En softwareopdatering i gang” (*A software update in progress*) in the MT match,

used Copy Source to Target and replaced “A software update in progress” with “En softwareopdatering i gang”. Thus, Translator G also used the Copy Source to Target function in this segment to include the tag in the final translation.

The 26 rejected MT matches were all rejected by use of the Copy Source to Target function. The matches are shown in Table 23.

Segment number	Match type	Source segment	Match	Rejected by translator(s)
3	MT	Which MODE setting to use depends on the type of your Bang & Olufsen television.	Hvilken TILSTAND indstilling afhænger af dit Bang & Olufsen fjernsyn. BT: Which MODE setting depends on your Bang & Olufsen television.	B, D
5	MT	PL- A (PL1)	PL- (PL1) BT: PL- (PL1)	C, E, G
23	MT	How should I set the bass position knob (FREE, WALL, CORNER) on BeoLab 14 ?	Hvordan skal jeg indstille bass positionsknappen (FRI , WALL , HJØRNE) på BeoLab 14 ? BT: How should I set the bass position knob (FREE , WALL , CORNER) on BeoLab 14 ?	B, D
39	MT	Why does my BeoLab 14 not switch to standby after 3 minutes with no sound, when the MODE switch is set to LINE or AMP ?	Hvorfor bliver min BeoLab 14 ikke omskifter til standby efter 3 minutter uden lyd, når tilstanden omskifter er indstillet til Line eller AMP ? BT: Why does my BeoLab 14 not become switch to standby after 3 minutes without sound, when the mode switch is adjusted to Line or AMP ?	E
41	MT	To avoid noise on the LINE or AMP signal <i>m ake sure that you have connected all sockets on BeoLab 14 to the corresponding sockets on the connected product.</i>	For at undgå støj på Line eller AMP signal <i>m ake sikker på, at du har tilsluttet alle stik på BeoLab 14 til de tilsvarende stik på det tilsluttede produkt.</i> BT: To avoid noise on Line or AMP signal m ake sure that you have connected all sockets on BeoLab 14 to the corresponding sockets on the connected produkt.	E
43	MT	MODE switch set to AMP	TILSTAND omskifter indstillet til AMP BT: MODE switch set to AMP	E
44	MT	MODE switch set to LINE	TILSTAND omskifter indstillet til Line BT: MODE switch set to Line	E
52	MT	Do not disconnect BeoLab 14 from the mains during the software update.	Afbryd ikke BeoLab 14 fra lysnet under softwareopdatering. BT: Do not diconnect BeoLab 14 from the mains during software update.	C, D, E
55	MT	[tag]Switched on (10 seconds duration)	Tændt (10 sekunder varighed) BT: Switched on (10 second duration)	B, C, D
58	MT	[tag]Switched off (10 seconds duration)	Slukket (10 sekunder varighed) BT: Switched off (10 second duration)	B, C, D, E
60	MT	[tag]Product failure:	Produktfejl: BT: Product failure:	C, D, E
63	MT	[tag>Error indication, e.g. at overheating:	Fejl, f.eks. ved overophedning: BT: Error, e.g. at overheating:	C, D

Table 23. Rejected MT matches - FAQ text

All of the rejected MT matches had at least one of the following three characteristics: 1) the entire source segment text could be transferred directly to the target text segment and used as the translation in an unchanged form (segment 5), 2) the source segment contained one or more red words which should remain untranslated in the target text (such as *BeoLab 14*,

MODE, FREE, WALL, CORNER, LINE, AMP and *Technical Sound Guide*, cf. Section 4.3.1.1.3.1.4.1.2) (segments 3, 23, 39, 41, 43, 44, and 52), and 3) the source segment contained a tag indicating the presence of a visual element in the text which also had to be present in the target segment (segments 55, 58, 60 and 63). In the first case, in Schjoldager's (2010) terminology, the microstrategy of "direct transfer" is possible. Schjoldager (2010, p.93) notes herself that copying the source text to the target segment is an instance of direct transfer. Concerning the second and third cases, the data suggest that the translators (primarily Translators B, C, D and E) preferred rejecting the match and editing the source segment instead of the match when the source segment contained red words that should remain untranslated or visual elements (this is further addressed in Section 5.2.2.2.3.3.2). In these cases, parts of the source segments could be used in the translation in an unchanged form (the red words and the tags), and the translators needed to translate the remaining parts of the segments from English into Danish. This is interesting since the translators could also, for example, have copied the red words and tags from the source segment and pasted them into the target segment. In this case, the match would have remained in the target segment and could have been used by the translators. In the retrospective interviews, all translators except Translator A explained that they use the Copy Source to Target function when the source text contains tags, formatting, names and/or words that should remain untranslated in the target text. In the experiment, words were only marked by red to make translators aware that they should remain untranslated in the target text (and not because they should also be marked in red in the target text), but the translators generally made sure that the words were also marked in red in the target text. Thus, in the case of the red words, we cannot know whether the translators used the Copy Source to Target function to transfer the red formatting to the target text or to avoid typing the words in the target text themselves (which would also involve the risk of misspelling) or both. Put differently, we cannot know whether the translators would have typed the words in the target text themselves if they had not been formatted in red or whether they would also have used the Copy Source to Target function.

Interestingly, all of the rejected TM matches addressed above also had one or more of these three characteristics. In segments 12, 26, 29, 32, direct transfer of the whole source segment was possible, segments 26, 29, 32, 46 and 71 contained red words and segment 51 contained a tag indicating the presence of a visual element. Thus, the analysis indicates that certain elements trigger the rejection of MT matches, first and foremost by use of the Copy Source to Target function.

Finally, in relation to source segments that contained a visual element, it is interesting to observe that the visual elements had not been included in the matches. From a TCI perspective, it is interesting to consider whether the translators would have revised, not rejected, the matches if the visual elements had been included in the matches. Unfortunately, I have no knowledge of the mechanisms behind this.

In the **Newsletter**, four matches were rejected. As shown in Table 24, two were rejected using the Copy Source to Target function and two by insertion of MT match instead of the proposed TM match. No matches were rejected by "pure" deletion, i.e. none of the

translators rejected a match by, so to speak, “manually” deleting each letter or using the mouse or keyboard to select the match and delete it.

Match type	Total number of rejected matches	Copy Source to Target	Insertion of MT match	"Pure" deletion
100%	0	0	0	0
95-99%	0	0	0	0
85-94%	0	0	0	0
75-84%	2	0	2	0
70-74%	0	0	0	0
MT	2	2	N/A	0
In total	4	2	2	0

Table 24. Rejection type for all translators - Newsletter

The two rejected 75-84% matches are shown in Table 25. These were both rejected by Translator G and, in both cases, he replaced the TM matches with the provided MT matches.

Segment number	Match type	Source segment	Match	MT match inserted instead of TM match	Rejected by translator(s)
2	77%	BeoSound 5 relaunched with Spotify integration	BeoSound 5 – med Spotify Inside BT: BeoSound 5 – with Spotify inside	BeoSound 5 - relanceret med Spotify-integration BT: BeoSound 5 – relaunched with Spotify-integration	G
9	78%	Bang & Olufsen launches next-generation retail concept	Bang & Olufsen lancerer kæmpejernsynskoncept BT: Bang & Olufsen launches giant television concept	Bang & Olufsen lancerer næste generations lydssystem BT: Bang & Olufsen launches next generation's sound system	G

Table 25. Rejected 75-84% matches - Newsletter

In segment 2, the MT match provided is a more adequate translation of the source segment than the 77% match pre-inserted into the target segment which is probably the reason why Translator G replaced the TM match with the MT match. After insertion of the MT match, Translator G replaced the hyphen between “5” and “relanceret” with a dash and deleted “-integration”. Later in the editing phase, the translator returned to the segment and wrote “-integration” after “Spotify”, thus reproducing what was suggested by the MT engine. In segment 9, although “lydssystem” (*sound system*) is not a correct rendering of “retail concept”, the MT match provided seems to be closer to an adequate translation of the source segment than the pre-inserted 78% match which probably made Translator G replace the TM match with the MT match. Translator G’s rejection of segment 9 is illustrated below (example 7-NL-G-9).

The two rejected MT matches include one match which was rejected by two translators (B and E) (cf. Table 26). Both translators rejected the match using the Copy Source to Target function.

Segment number	Match type	Source segment	Match	Rejected by translator(s)
22	MT	B&O PLAY television wins coveted red dot award	B&O afspille tv vinder den eftertragtede rød prik pris BT: B&O play tv wins the coveted red dot award	B, E

Table 26. Rejected MT matches - Newsletter

Using the Copy Source to Target function might have been motivated by “B&O PLAY” and “red dot award”, which both translators retained in the final translation. Translator E’s process in segment 22 is illustrated in the process examples below (example 8-NL-E-22).

It is somewhat surprising that only four matches were rejected (equalling 2%) in the Newsletter, particularly as a couple of MT matches seemed to be of quite a low quality, as noted by most of the translators in the retrospective interviews. Especially the matches in segments 11 and 12 (see Table 27) were said to be almost gibberish or nonsense, with Translator H even stating that the match in segment 11 is an example of MT “at its worst”.²⁷ However, all of the translators chose to revise these matches instead of rejecting them. For some of the translators (B, D and F), this may be explained by the information given in the webinar on post-editing which they attended approximately three months prior to the experimental study (cf. Section 5.1.1), where they were told not to “ignore or erase the machine translation output and translate from scratch” and to “[r]etain as much raw output as possible”. Translator B mentioned something similar in the retrospective interview when he said that the recommendation is to revise the MT output instead of just discarding it, although without referring to the webinar. Also, as mentioned in Section 4.3.2.1, since the study was conducted around the time when MT was first implemented at TextMinded, the translators may have expected me to be particularly interested in MT and thus may have thought that they were required to work with the MT matches proposed to them, even though I never specifically told them so. However, the translators did not seem to follow this in the translation of the FAQ text, where a higher percentage of MT matches was rejected (12%, cf. Section 5.2.2.1).

Segment number	Match type	Source segment	Match
11	MT	Experiencing the brand’s acoustic innovations first-hand has never been more accessible or compelling.	Opleve den brand akustiske nyskabelser det har aldrig været nemmere lydfronten. BT: Experience that brand acoustic innovations it has never been easier the sound front.
12	MT	In an atmosphere that is luxurious but welcoming, the new design captivates curiosity as you move through the store.	I en atmosfære, luksuriøst, men imødekommende, det nye design samtidig når man går gennem gemme. BT: In an atmosphere, luxurious, but welcoming, the new design simultaneously when you walk through hide.

Table 27. Examples of MT matches - Newsletter

²⁷ Cf. also the HTER analysis in Section 5.6, where segments 11 and 12 were among the segments with the highest HTER scores, i.e. among the segments in which most edits were made.

5.2.2.2.1 Process examples

In the following, two process examples from both the FAQ text and the Newsletter are provided for the *reject* category.

Example 5-FAQ-D-3:

One of the matches that was rejected using the Copy Source to Target function in the FAQ text is the match in segment 3, an MT match rejected by Translator D. The translator started out by using the Copy Source to Target function, replacing the match with the source text segment (step 2). During the retrospective interview, the translator stated that the reasons she used the Copy Source to Target function were that the match had to be reformulated in its entirety, that something from the source segment had to be retained in the target text ("MODE" which was formatted in red and had been translated into "TILSTAND" by the MT engine) and that the match contained tags that were not in the right order. Thus, she would rather copy the source segment to the target segment instead of moving these elements around. In steps 3 and 4, the translator alternated between deleting parts of the English source text and typing the Danish translation. When typing "indstillingen" (step 3), the translator was offered "indstilling" by the AutoSuggest function, but she did not accept the suggestion, although it was very close to what she ended up writing. During the interview, I asked the translator if she remembered whether she drew on the suggested match (which was still visible to her in the Translation Results Window in the upper part of the screen) after using the Copy Source to Target function. She answered that she translated based on the source segment, meaning that she did not draw on the MT match. Also, she mentioned that she was uncertain whether "television" should be translated as "fjernsyn" (*television*) or "tv" (*TV*) and that she made a quick decision and used "fjernsyn", thinking that she might "become wiser" later in the text, i.e. the subsequent text may confirm her decision or cause her to change her mind.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator D	3	MT	Reject	N/A	Which [tag]MODE[tag] setting to use depends on the type of your Bang & Olufsen television.
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Hvilken TILSTAND[tag][tag] indstilling afhænger af dit Bang & Olufsen fjernsyn. BT: Which MODE setting depends on your Bang & Olufsen television.		
2	Uses Copy Source to Target.		Which [tag]MODE[tag] setting to use depends on the type of your Bang & Olufsen television.		App. 6, D, ll. 235-246
3	Selects "Which" and deletes it. Writes "-indstillingen" after "MODE" and the tag. While writing "-indstillingen", the translator is offered "indstilling" by the AutoSuggest function. It is not used by the translator.		[tag]MODE[tag]-indstillingen setting to use depends on the type of your Bang & Olufsen television.		App. 6, D, ll. 249-263

4	Writes "afhænger af dit". Deletes "setting to use depends on the type of your". Writes "-fjernsyn" after "Olufsen". Deletes "television".	[tag]MODE[tag]-indstillingen afhænger af dit Bang & Olufsen-fjernsyn.
---	---	---

During the checking phase, the translator entered segment 3 and implemented changes which resulted in the translation “MODE-indstillingen afhænger af, hvilket Bang & Olufsen-fjernsyn du har.” (*The MODE setting depends on which Bang & Olufsen television you have.*).

Example 6-FAQ-E-39:

Translator E rejected the match in segment 39, also using the Copy Source to Target function, thus replacing the match with the source text segment (step 2). In the interview, Translator E said that she thought that the reason was that she could use some of the terms, but that the match was a bit of a mess. Judging from the match, she most likely got this impression because the MT engine translated the construction “Why does my BeoLab 14 not switch to” into “Hvorfor bliver min BeoLab 14 ikke omskifter til” (*Why does my BeoLab 14 not become switch to*), which is not a correct translation since the verb “switch” has been translated into the Danish noun “omskifter” (*switch*). Furthermore, the noun “omskifter” (*switch*) cannot be combined with “bliver” (*become*) in this way. The reason for this translation was possibly that the termbase included the English noun “switch” with the Danish noun “omskifter” (*switch*) as its translation, and that the termbase was set to overrule the MT translation if the source text segment contained a word included in the termbase (here: *switch*). Furthermore, “MODE”, which was marked in red and was thus to remain untranslated in the target text, had been translated into “tilstanden”, and a number of tags were not placed correctly.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator E	39	MT	Reject	N/A	Why does my [tag]BeoLab 14[tag] not switch to standby after 3 minutes with no sound, when the [tag]MODE[tag] switch is set to [tag]LINE[tag] or [tag]AMP[tag]?
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Hvorfor bliver min[tag] BeoLab 14[tag] ikke omskifter til standby efter 3 minutter uden lyd, når tilstanden[tag][tag] omskifter er indstillet til[tag] Line[tag] eller AMP[tag][tag] ? BT: Why does my BeoLab 14 not become switch to standby after 3 minutes without sound, when the mode switch is adjusted to Line or AMP ?		
2	Uses Copy Source to Target.		Why does my [tag]BeoLab 14[tag] not switch to standby after 3 minutes with no sound, when the [tag]MODE[tag] switch is set to [tag]LINE[tag] or [tag]AMP[tag]?		App. 6, E, ll. 180-189
3	Writes "Hvorfor" in the beginning of the segment. Deletes "Why does		Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutes with no		

	my". Writes "skifter min". Writes "ikke til" after "14". Deletes "not switch to". Deletes "a" in "after", writes "e".	sound, when the [tag]MODE[tag] switch is set to [tag]LINE[tag] or [tag]AMP[tag]?	
4	Places the cursor between "minut" and "es" in "minutes" and writes "ter uden lyd". While writing "lyd", the translator is offered "lydtype" by the AutoSuggest function, but does not use it. Deletes "es with no sound".	Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, when the [tag]MODE[tag] switch is set to [tag]LINE[tag] or [tag]AMP[tag]?	
5	Writes "når" before "when". Deletes "when the". Selects "MODE switch" in the target segment and runs a concordance search. It finds occurrences of "switch mode" in Danish text in the TM. Selects "switch" in the target segment and runs a concordance search. It finds occurrences of "switch" in Danish text in the TM.	Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, når [tag]MODE[tag] switch is set to [tag]LINE[tag] or [tag]AMP[tag]?	App. 6, E, II. 193-195
6	Selects "switch" in the source segment and runs a concordance search. Selects "MODE switch" in the source segment and runs a concordance search. No relevant results. Writes "-omskifteren er sat til". When writing "omskifteren", the translator is offered "omskifter" by the AutoSuggest function, but does not use it.	Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, når [tag]MODE[tag]-omskifteren er sat til switch is set to [tag]LINE[tag] or [tag]AMP[tag]?	
7	Deletes "switch is set to". Deletes "o" in "or", writes "elle".	Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, når [tag]MODE[tag]-omskifteren er sat til [tag]LINE[tag] eller [tag]AMP[tag]?	
8	Returns to this segment after having entered segment 46. Selects "sat" and deletes it by writing "indstillet".	Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, når [tag]MODE[tag]-omskifteren er indstillet til [tag]LINE[tag] eller [tag]AMP[tag]?	

After using the Copy Source to Target function, Translator E built the translation by typing around the elements that she wanted to retain and deleting the remaining parts of the source segment (steps 3-7). During this process, the translator was offered two suggestions by the AutoSuggest function, but she did not accept either of them (steps 4+6), although in step 6, she typed the same word as had been suggested ("omskifter"). In steps 5 and 6, she ran four concordance searches. She ran the first two from the target segment which yielded results where the English expressions "MODE switch" and "switch" had been used in Danish texts; however, this was not what Translator E was looking for, since she was looking for cases where the term had been translated into Danish. Afterwards, she ran searches from the source segment which did not seem to provide her with a relevant translation either. The translator did not mention in the interview why she ran the searches from both the source and the target side. However, she explained that after using Copy Source to Target, she looked at the MT match (which was visible to her in the Translation Results window), because she wanted to see whether she could "steal" some terms from the match. Also, she said that she thought she searched on "MODE switch" to find out how "switch" should be

translated, adding that she might have translated it earlier in the process and had forgotten it. Later in the translation process, i.e. after having entered segment 46, the translator returned to this segment, deleted “sat” (*set*) and wrote “indstillet” (*adjusted*) instead (step 8), thus using the verb that was suggested in the MT match.

Example 7-NL-G-9:

Of the four matches that were rejected in the Newsletter, one was discussed during the retrospective interview, namely Translator G’s process when editing segment 9, a 78% match. In this segment, the translator chose to replace the 78% match with the MT match visible to him in the Translation Results window (step 2). In the interview, he explained that he did so because he could use more of the MT match than of the TM match.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator G	9	78%	Reject	N/A	Bang & Olufsen launches next-generation retail concept
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Bang & Olufsen lancerer kæmpefjernsynskoncept BT: Bang & Olufsen launches giant television concept		
2	Inserts the MT match visible in the Translation Results window.		Bang & Olufsen lancerer næste generations lydsystem		App. 6, G, ll. 451-461
3	Selects "lydsystem" and deletes it by writing "forhandlerkoncept". Selects "næste generations" and deletes it by writing "et splinternyt". Deletes "rinter", writes "linternyt". Selects "splinternyt" and copies it.		Bang & Olufsen lancerer et splinternyt forhandlerkoncept		App. 6, G, ll. 467-482
4	Returns to this segment after having worked with other segments. Selects the space between "Bang" and "&" and replaces it with a non-breaking space.		Bang & Olufsen lancerer et splinternyt forhandlerkoncept		

In step 3, Translator G deleted “lydsystem” (*sound system*) and wrote “forhandlerkoncept” (*retail concept*) instead which is a more adequate rendering of “retail concept”. Then, he replaced “næste generations” (*next generation’s*) with “et splinternyt” (*a brand-new*). Next, he copied “et splinternyt”, briefly entered segment 10 and then returned to segment 1 to replace “næste generations” with “splinternyt”. In the interview, he said that he remembered that the same phrase was used in the beginning of the text, and therefore, he returned to segment 1 to implement the change there as well. After having implemented the change in segment 1, the translator entered segment 2, made a change there and then proceeded to segment 10. However, after having worked with segment 10, he briefly entered segment 11 and then returned to segment 9, where he inserted a non-breaking space (a symbol preventing a line break at its position) between “Bang” and “&” (step 4). Earlier in the retrospective interview, Translator G had explained that the insertion of non-breaking spaces in product names as well as between “Bang” and “&” in “Bang & Olufsen” is a requirement from Bang & Olufsen, because the client prefers to avoid line breaks in

names. This preference is also mentioned in one of the two Bang & Olufsen-specific style guides which I collected during the contextual study. However, the style guide was not consulted by the translator during the translation process. Later in the interview, the translator added that his prior experience of translating for Bang & Olufsen (cf. Section 5.1.3) meant that he knew the client's preferences, for example with regard to the insertion of non-breaking spaces. Finally, it is interesting, in Translator G's editing of this segment, that he ended up having deleted the parts of the MT match that differed from the TM match, which he had replaced. Therefore, it seems that he might as well have revised the TM match.

Example 8-NL-E-22:

Another example of a rejected match is the match in segment 22, which was rejected by Translator E. In this segment, the translator rejected the match using the Copy Source to Target function after having run a concordance search for "B&O PLAY television" (step 2).

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator E	22	MT	Reject	N/A	B&O PLAY television wins coveted red dot award
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		B&O afspille tv vinder den eftertragtede rød prik pris BT: B&O play tv wins the coveted red dot award		N/A
2	Selects "B&O PLAY television" in the source segment and runs a concordance search. Uses Copy Source to Target.		B&O PLAY television wins coveted red dot award		
3	Writes "vinder den eftertragtede" between "PLAY" and "television". Deletes "television wins coveted ". Selects "red dot award" and copies it. Goes to Google and runs a search for "red dot award". Google is still set to "sites in Danish". The translator adjusts the settings to search the Web in general. Clicks on the Web page with the title: "red dot online: home". Returns to the translation file and confirms segment 22.		B&O PLAY vinder den eftertragtede red dot award		
4	Returns to this segment while working with segment 23 to copy "den eftertragtede red dot award".		B&O PLAY vinder den eftertragtede red dot award		

After this, the translator wrote "vinder den eftertragtede" (*wins the coveted*) and deleted "television wins coveted". She then went to Google where she ran a search for "red dot award". Google was set to "sites in Danish" from a previous search, so the translator adjusted the settings to search the Web in general. The translator then clicked on a Web page with the title "red dot online: home" (see Figure 16) and after this, she returned to SDL Trados Studio and proceeded to the next segment (step 3). Thus, we must assume that the Google search and the visit to the Web page confirmed the translator's initial choice of

transferring “red dot award” directly to the target segment. The translator ended up omitting a translation of “television”. In Schjoldager’s (2010) terms, this may be described as an instance of condensation, since, although the source-text item “television” appears to have been deleted, it is still implicitly present, as it is evident from the context that the mentioned product is a television. The segment was not brought up during the retrospective interview. While translating segment 23, the translator returned to this segment to copy “den eftertragtede red dot award”, which she then inserted in segment 23 (step 4, see example 26-NL-E-23).

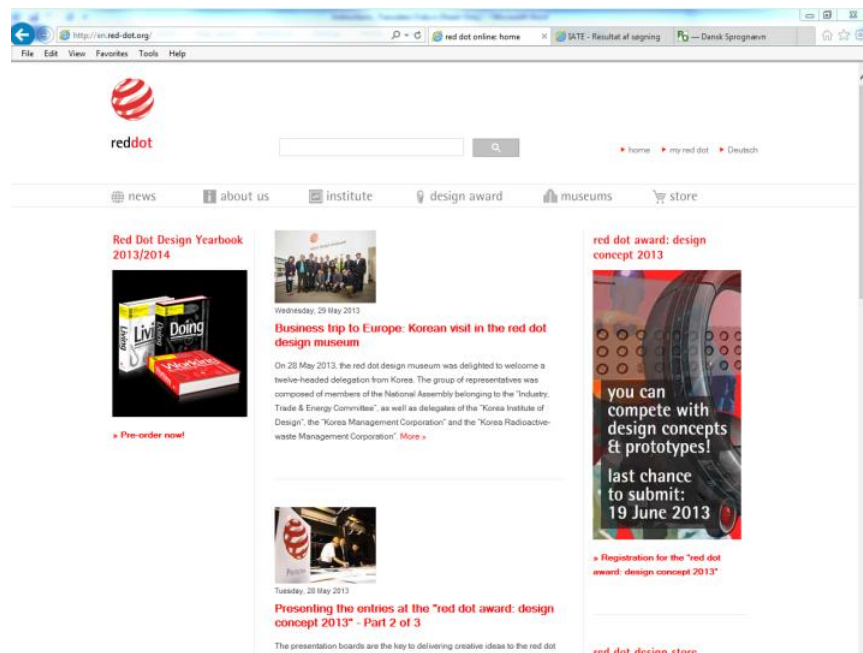


Figure 16. Process example 8-NL-E-22 - Consultation of Web page

5.2.2.2.3 The *revise* category

If the proposed match was modified by the translator, the segment was categorized as belonging to the *revise* category. The matches in the *revise* category were further categorized into *match-internal* or *match-external* revision. In Section 5.2.2.2.3.1, quantitative results on the distribution of the revised matches into the subcategories *match-internal* and *match-external revision* are presented for both the FAQ text and the Newsletter. In Sections 5.2.2.2.3.2 and 5.2.2.2.3.3, for match-internal and match-external revision, respectively, translation processes are analyzed in order to contribute further to identifying characteristics of the translators’ interaction with the MT-assisted TM tool. In terms of match-internal revision, focus is on the instances where the translators were offered automatic translation suggestions by the AutoSuggest function, and in terms of match-external revision, the analysis focuses on the resources and functionalities that the translators employ during the revision of the matches. In both of these sections, process examples are provided from both the FAQ text and the Newsletter.

5.2.2.2.3.1 Match-internal and match-external revision: Distribution

In this section, the distribution of revised matches into *match-internal* and *match-external* revision is presented for the FAQ text and the Newsletter. For each text, a table is provided which includes the results for each individual translator, and a table is provided which has the results for all the translators combined. In the accompanying text, the results for all translators combined are first commented upon, before individual differences between the translators are addressed.

For the **FAQ** text, the distribution of revised matches into *match-internal* and *match-external* revision is shown in Table 28 for each translator and in Table 29 for all translators combined.

Match type	Translator A				Translator B				Translator C				
	No. of revised matches	Match-internal		Match-external	No. of revised matches	Match-internal		Match-external	No. of revised matches	Match-internal		Match-external	
100%	1	1	100%	0	0%	0	0	N/A	1	0	0%	1	100%
95-99%	2	1	50%	1	50%	0	0	N/A	1	1	100%	0	0%
85-94%	3	1	33%	2	67%	3	2	67%	2	1	50%	1	50%
75-84%	3	3	100%	0	0%	2	2	100%	2	2	100%	0	0%
70-74%	3	0	0%	3	100%	2	0	0%	2	0	0%	2	100%
MIT	27	3	11%	24	89%	23	15	65%	22	13	59%	9	41%
In total	39	9	23%	30	77%	30	19	63%	30	17	57%	13	43%

Match type	Translator D					Translator E				Translator G					
	No. of revised matches	Match-internal		Match-external		No. of revised matches	Match-internal		Match-external		No. of revised matches	Match-internal		Match-external	
100%	5	5	100%	0	0%	0	0	N/A	0	N/A	2	0	0%	2	100%
95-99%	4	2	50%	2	50%	2	1	50%	1	50%	2	2	100%	0	0%
85-94%	3	1	33%	2	67%	2	0	0%	2	100%	3	2	67%	1	33%
75-84%	3	2	67%	1	33%	3	1	33%	2	67%	3	2	67%	1	33%
70-74%	2	0	0%	2	100%	2	0	0%	2	100%	2	0	0%	2	100%
MIT	18	9	50%	9	50%	20	5	25%	15	75%	27	10	37%	17	63%
In total	35	19	54%	16	46%	29	7	24%	22	76%	39	16	41%	23	59%

Match type	Translator H			
	No. of revised matches	Match-internal		Match-external
100%	3	2	67%	1 33%
95-99%	3	2	67%	1 33%
85-94%	3	2	67%	1 33%
75-84%	3	2	67%	1 33%
70-74%	2	1	50%	1 50%
MT	28	8	29%	20 71%
In total	42	17	40%	25 60%

Table 28. Revise category: match-internal and match-external revision for each translator - FAQ text

Match type	All translators			
	Total no. of revised matches	Match-internal		Match-external
100%	12	8	67%	4 33%
95-99%	14	9	64%	5 36%
85-94%	19	9	47%	10 53%
75-84%	19	14	74%	5 26%
70-74%	15	1	7%	14 93%
MT	165	63	38%	102 62%
In total	244	104	43%	140 57%

Table 29. Revise category: match-internal and match-external revision for all translators - FAQ text

Table 29 shows that, for all the translators, in 100% and 95-99% TM matches, match-internal revision is more frequent than match-external revision.²⁸ For 85-94% matches, match-internal and match-external revision are almost equally frequent, and for 75-84% matches, match-internal revision is more frequent than match-external. However, for both 70-74% matches and MT matches, match-external revision is more frequent than match-internal (with 93% and 62%, respectively). Thus, the study suggests that translators primarily rely on their own judgement when revising TM matches with match values from 75% and up, as opposed to making use of resources and functionalities external to the match, whereas in TM matches with lower fuzzy match values and in MT matches, translators need other support than the proposed match during revision. Interestingly, for 70-74% TM matches, match-external revision is clearly most frequent (93%), whereas for MT matches, match-external support is required in 62% of cases. If the extent of the translators needing match-external revision is an indication of the quality of the matches and the higher percentage of match-external revision in 70-74% matches is thus an indication that the quality of these matches was lower than the quality of the MT matches, this may lead one to speculate whether the TM/MT threshold should be set higher than 70%. To determine whether this would be advantageous, however, further exploration is required since the number of matches in the 70-74% match type is quite low, and a result pointing in this direction would also need to be seen in the light of data on, for instance, the time taken to revise these matches. This point will be addressed in Section 5.3.

Table 28 provides results for the different match types for each individual translator and indicates some individual differences. For instance, two of the translators (B and E) do not revise any 100% matches. For three of the remaining five translators (A, D and H), match-internal revision is more frequent than match-external revision in 100% matches, whereas match-external revision is more frequent for Translators C and G. Translator B does not revise any 95-99% matches, but for the remaining six translators, match-internal and match-external revision are either equally frequent (A, D and E), or match-internal revision is most frequent (C, G and H). For 85-94% matches, the picture is very mixed. Here, three translators tend to use match-internal revision (B, G and H), three translators tend to use match-external revision (A, D and E), and one translator uses match-internal and match-external revision equally often (C). In contrast, for 75-84% matches, all translators but one (E) use match-internal revision more often than match-external, and for 70-74% matches, all translators but one (H) use match-external revision more often than match-internal. For MT matches, five translators use match-external revision equally or more often than match-internal revision (A, D, E, G and H), whereas Translators B and C use match-internal revision more often. The bar chart in Figure 17 illustrates the individual translators' total use of match-internal and match-external revision in the FAQ text. Here, we see that when they revised a match, Translators A, E, G and H tended to do it by means of match-external revision, whereas Translators B, C and D primarily revised matches using match-internal revision.

²⁸ Translators B and E did not revise any of the 100% matches, and Translator B did not revise any of the 95-99% matches. Therefore, Table 29 does not contain observations from these translators.

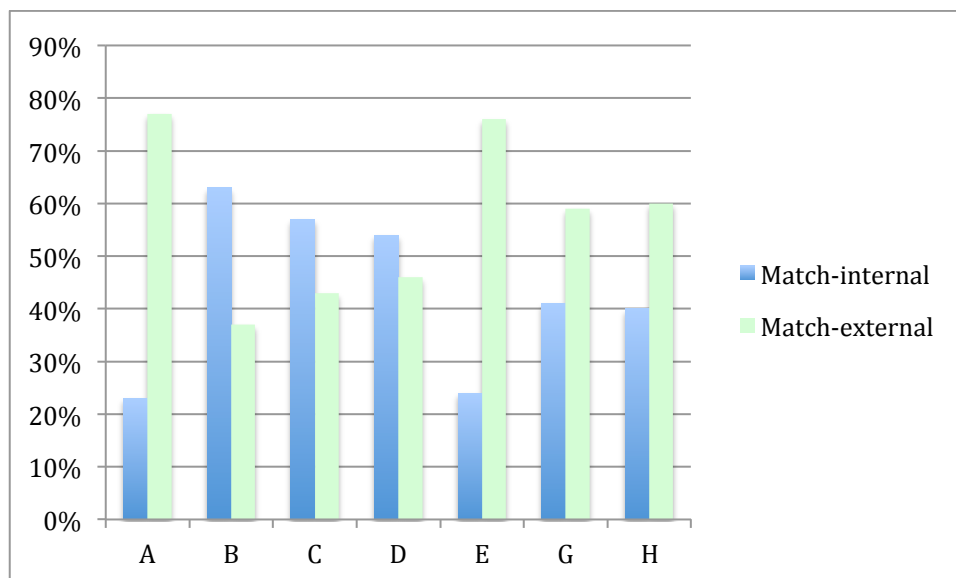


Figure 17. Total use of match-internal and match-external revision - FAQ text

For the **Newsletter**, the distribution of the revised matches into match-internal and match-external revision is shown for each translator in Table 30 and for all translators in Table 31. As shown in Table 31, only one 100% match was revised and this one match was revised using match-external revision. All of the 95-99%, 85-94%, 75-84% and 70-74% match types were mostly revised using match-internal revision. 56% of revised MT matches were revised using match-external revision. Thus, the results suggest that translators tended to rely on their own judgement in TM matches and that in MT matches, they more often needed to carry out research by means of resources and functionalities external to the match. Thus, following from the comment made above with regard to the TM/MT threshold, in the Newsletter, the data did not suggest that it should be set higher than 70%.

With a few exceptions²⁹, as shown in Table 30, the individual translators also revised all fuzzy TM match types by means of match-internal revision. For MT matches, match-external revision is more frequent for Translators A, C, E and H, and this tendency is more pronounced for Translators A and E than for Translators C and H. For Translators B, D and G, match-internal revision is more frequent than match-external. When we look at the individual translators' total use of match-internal and match-external revision in Figure 18, we see that when they revised a match in the Newsletter, Translators A and E tended to do it using match-external revision, whereas Translators B, C, D, G and H primarily revised matches by means of match-internal revision.

²⁹ Translator E uses match-external revision more often than match-internal revision in 75-84% matches, and Translators A and C use match-internal and match-external revision equally often in 85-94% matches.

Match type	Translator A				Translator B				Translator C				
	No. of revised matches	Match-internal		Match-external	No. of revised matches	Match-internal		Match-external	No. of revised matches	Match-internal		Match-external	
100%	0	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
95-99%	1	1	100%	0	0%	1	100%	0	0%	1	100%	0	0%
85-94%	2	1	50%	1	50%	1	100%	0	0%	2	50%	1	50%
75-84%	5	3	60%	2	40%	5	80%	1	20%	5	100%	0	0%
70-74%	3	3	100%	0	0%	3	67%	1	33%	2	100%	0	0%
MIT	13	2	15%	11	85%	12	58%	5	42%	13	46%	7	54%
In total	24	10	42%	14	58%	22	68%	7	32%	23	65%	8	35%

Match type	Translator D				Translator E				Translator G				
	No. of revised matches	Match-internal		Match-external	No. of revised matches	Match-internal		Match-external	No. of revised matches	Match-internal		Match-external	
100%	0	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
95-99%	1	1	100%	0	0%	1	100%	0	0%	1	100%	0	0%
85-94%	2	2	100%	0	0%	2	100%	0	0%	1	100%	0	0%
75-84%	5	5	100%	0	0%	5	40%	3	60%	3	67%	1	33%
70-74%	3	3	100%	0	0%	3	67%	1	33%	3	67%	1	33%
MIT	13	8	62%	5	38%	10	20%	8	80%	11	55%	5	45%
In total	24	19	79%	5	21%	21	43%	12	57%	19	63%	7	37%

Match type	Translator H			
	No. of revised matches	Match-internal		Match-external
100%	1	0	0%	1 100%
95-99%	1	1	100%	0 0%
85-94%	1	1	100%	0 0%
75-84%	5	3	60%	2 40%
70-74%	3	3	100%	0 0%
MT	13	6	46%	7 54%
In total	24	14	58%	10 42%

Table 30. Revise category: match-internal and match-external revision for each translator - Newsletter

Match type	All translators			
	Total no. of revised matches	Match-internal		Match-external
100%	1	0	0%	1 100%
95-99%	7	7	100%	0 0%
85-94%	11	9	82%	2 18%
75-84%	33	24	73%	9 27%
70-74%	20	17	85%	3 15%
MT	85	37	44%	48 56%
In total	157	94	60%	63 40%

Table 31. Revise category: match-internal and match-external revision for all translators - Newsletter

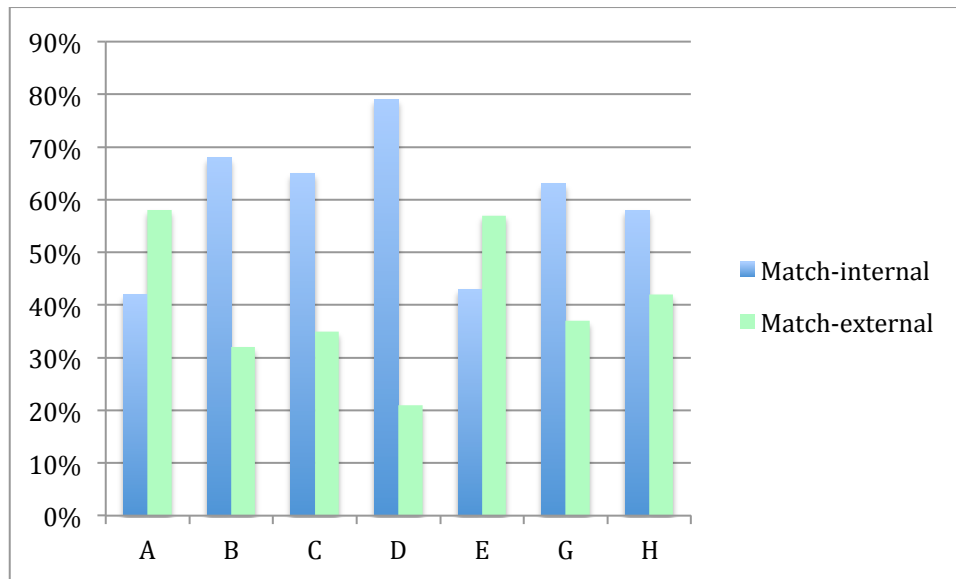


Figure 18. Total use of match-internal and match-external revision - Newsletter

5.2.2.2.3.2 Match-internal revision

In the matches that were revised using match-internal revision, i.e. without the use of resources or functionalities external to the match, the primary observable actions were the typing and deletion of text. Apart from typing and deleting text, what could be observed in matches categorized as match-internal were suggestions provided by the AutoSuggest function. This section focuses on these suggestions. In Section 5.2.2.2.3.2.1, matches revised by means of match-internal revision are exemplified through process examples.

As explained in Section 5.2.1, using the AutoSuggest function was categorized as a match-internal activity, since these suggestions are provided automatically as the translators type. In the **FAQ** text, as shown in Table 32, the translators were, in total, offered 21 suggestions by the AutoSuggest function in revised matches categorized as belonging to the match-internal subcategory. The individual translators were offered between 1 and 6 suggestions. Translators A, B, C, D and E did not typically accept the suggestions, and Translators G and H accepted half of the suggestions they were offered. In total, AutoSuggest suggestions were accepted in 28.6% of cases.³⁰ This is interesting from a TCI perspective since one may speculate whether the AutoSuggest suggestions are overall more a hindrance to successful and frictionless interaction with the tool than they are an aid. However, the reason for the relative lack of usefulness of the AutoSuggest function might also be that the source(s)

³⁰ Translators were also provided with suggestions from the AutoSuggest function in matches categorized as match-external revision and in matches categorized as belonging to the reject category (because after having rejected a match, the translator might be provided with AutoSuggest suggestions while typing the translation). In the FAQ text, in matches categorized as match-external revision, the translators received 15 suggestions in total with four being accepted (26.7%), and in matches categorized as reject, they received 24 suggestions with 2 being accepted (8.3%). Thus, translators did not tend to accept AutoSuggest suggestions in either of the categories.

which the AutoSuggest function draws on in this case is/are not large enough to aid translators to a large extent.³¹

Translator	Number of suggestions	Accepted	Not accepted
A	3	0	3
B	3	1	2
C	2	0	2
D	2	0	2
E	1	0	1
G	4	2	2
H	6	3	3
In total	21	6 (28.6%)	15 (71.4%)

Table 32. AutoSuggest suggestions during match-internal revision - FAQ text

In the **Newsletter**, as shown in Table 33, the translators were offered a total of 17 suggestions from the AutoSuggest function in matches categorized as match-internal. The individual translators were offered between 0 and 5 suggestions, and all translators typically did not accept what was suggested. In total, only one suggestion was accepted (by Translator G), equaling 5.9% of the suggestions.³² Thus, it seems that the AutoSuggest function only aided the process in one case.

Translator	Number of suggestions	Accepted	Not accepted
A	1	0	1
B	2	0	2
C	2	0	2
D	4	0	4
E	0	0	0
G	5	1	4
H	3	0	3
In total	17	1 (5.9%)	16 (94.1%)

Table 33. AutoSuggest suggestions during match-internal revision - Newsletter

5.2.2.3.2.1 Process examples

In this section, process examples of matches categorized as belonging to the match-internal subcategory are provided under the *revise* category. Two examples are provided from the FAQ text and the Newsletter, respectively.

³¹ Interestingly, during my first stay at TextMinded, when I was observing Translator F while he was working with another translation task, he said that “the AutoSuggest function is damn good”. Unfortunately, Translator F is the translator whose screen recording file was deleted and it was thus not possible to include his process in this analysis.

³² In the Newsletter, the translators did not receive any AutoSuggest suggestions in matches categorized as belonging to the reject category, but received 13 suggestions in total in matches revised by means of match-external revision. None of these suggestions was accepted by the translators (0%).

Example 9-FAQ-G-39:

Translator G's revision of the MT match in segment 39 in the FAQ text is an example of match-internal revision. As explained in example 6-FAQ-E-39, where Translator E rejected this match, the construction "Why does my BeoLab 14 not switch to" was translated into "Hvorfor bliver min BeoLab 14 ikke omskifter til" (*Why does my BeoLab 14 not become switch to*), which is not correct, since the English verb "switch" had been translated into the Danish noun "omskifter" (*switch*). Also, "bliver" (*become*) cannot be combined with "omskifter" in this context. Translator G thus started out by typing the correct translation of "switch", namely "skifter" (*switches*) and deleting "bliver min" (*does my*). In the retrospective interview, the translator explained that "min" (*my*) was not usually used in translations for Bang & Olufsen because the client prefers to keep texts more impersonal in Danish so that the text does not sound like a dialogue, but more like a general question. Thus, here he drew on his previous experience of translating for Bang & Olufsen. Then, the translator replaced the space between "BeoLab" and "14" with a non-breaking space in accordance with the client preferences mentioned above which the translator also referred to in the interview. Afterwards, the translator deleted "omskifter" (*switch*) (step 2).

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator G	39	MT	Revise	Match-internal	Why does my BeoLab 14 not switch to standby after 3 minutes with no sound, when the MODE switch is set to LINE or AMP ?
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Hvorfor bliver min BeoLab 14 ikke omskifter til standby efter 3 minutter uden lyd, når tilstanden omskifter er indstillet til Line eller AMP ? BT: Why does my BeoLab 14 not become switch to standby after 3 minutes without sound, when the mode switch is adjusted to Line or AMP ?		
2	Writes "skifter" between "Hvorfor" and "bliver". Deletes "bliver min". Selects the space between "BeoLab" and "14" and inserts a non-breaking space. Deletes "omskifter".		Hvorfor skifter BeoLab[®]14 ikke til standby efter 3 minutter uden lyd, når tilstanden omskifter er indstillet til Line eller AMP ?		App. 6, G, ll. 150-175
3	Selects the space between "3" and "minutter" and inserts a non-breaking space. Writes "MODE-om" after "når" and deletes "tilstanden om". Writes "en" at the end of "omskifter".		Hvorfor skifter BeoLab[®]14 ikke til standby efter 3 ^o minutter uden lyd, når MODE-omskifteren er indstillet til Line eller AMP ?		App. 6, G, ll. 177-186
4	Selects "Line" and changes it to capital letters. Deletes a space between "AMP" and "?".		Hvorfor skifter BeoLab[®]14 ikke til standby efter 3 ^o minutter uden lyd, når MODE-omskifteren er indstillet til LINE eller AMP?		

After this, the translator replaced the space between "3" and "minutter" with a non-breaking space. Later in the interview, the translator explained that he often inserts these non-breaking spaces to avoid numbers "dangling" at the end of a line. The MT engine had

translated “the MODE switch” as “tilstanden omskifter” (*the mode switch*). In this case, “switch” had been translated correctly into the noun “omskifter”. However, “MODE” was formatted in red in the source text and was thus supposed to remain untranslated in the target text. The translator therefore changed “tilstanden” into “MODE” (step 3). Earlier in the retrospective interview, the translator had explained that it was an old habit for him to ensure that the formatting was the same in the target text as in the source text, but here the translator mentioned that at this point, he did not format “MODE” in red, because it was not that important – the important thing was that it was not translated into Danish. In the termbase, “LINE” was translated into “Line”, which is probably the reason why the MT engine had translated “LINE” into “Line”, since the termbase was set to overrule output of the MT engine. The translator thus had to change “Line” back into capital letters (“LINE”). By contrast, “AMP” was not included in the termbase and was correctly transferred to the target text (step 4).

Example 10-FAQ-B-70:

Translator B revised the MT match in segment 70 using match-internal revision. In the match, “The surround sound processor” had been translated into “Det surround sound processoren”. However, “Det” is redundant in the match, since the definite form in Danish is rendered by adding the indefinite article “en” as a suffix at the end of the noun, in this case “processoren” and not by a prefix like in English (“The”). Translator B thus deleted “Det” (*The*). After this, the translator inserted a space between “surround” and “sound” and a hyphen between “sound” and “processoren” (step 2). Next, the translator changed “TV” to “tv’et” (*the TV*) (step 3).

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator B	70	MT	Revise	Match-internal	The surround sound processor is either integrated in the TV or needs to be purchased separately.
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Det surroundsound processoren er enten integreret i TV eller skal købes separat. BT: The surround sound processor is either integrated in TV or must be purchased separately.		
2	Writes "S" in the beginning of the segment. Deletes "Det s". Inserts a space between "Surround" and "sound". Inserts a hyphen between "sound" and "processoren".		Surround sound-processoren er enten integreret i TV eller skal købes separat.		
3	Writes "tv'et" between "i" and "TV". Deletes "TV".		Surround sound-processoren er enten integreret i tv'et eller skal købes separat.		
4	Writes "s" at the end of "købes", deletes "s". Writes "særskilt". While writing "særskilt", the translator is offered "surroundsound" by the		Surround sound-processoren er enten integreret i tv'et eller skal købes særskilt.		App. 6, B, ll. 332-345

	AutoSuggest function, but does not accept it. Deletes "separat".	
--	--	--

In the final step, the translator changed “separat” (*separately*) to “særskilt” (*individually*) (step 4). In the interview, he explained that “separat” in Danish is inspired by the English language and that it is a hobby horse of his to use a more Danish word, in this case “særskilt”. He added further that people write “separat” in Danish when the source text says “separately”, referring back to a comment he made in connection with his translation of segment 21 where he stated that an English sentence structure had become almost standard in Danish. Later in the retrospective interview, Translator B explained that he generally tries to find synonyms to the most obvious translations of source-text words (such as “særskilt” instead of “separate”), and that he uses this strategy to show clients that he is “not just a dictionary”. This point will be addressed further in Section 5.8.2.2.2.

Example 11-NL-D-6:

In the Newsletter, Translator D edited the match in segment 6 using match-internal revision. The translator started out by selecting “Integrationen er indbygget i alle nye versioner af BeoSound 5, og i” (*The integration is integrated in all new versions of BeoSound 5, and in*) and deleted it by writing “I” (*In*) (step 2). In the retrospective interview, the translator mentioned that she quickly found out that it was the first part of the sentence that needed to be deleted. This was visible to her in the Translation Results window in the upper part of the screen where the match was displayed and the textual differences between the new source segment and source segment retrieved from the TM were marked. Next, Translator D inserted a hyphen between “5” and “ejere” (*owners*). However, she then changed “eksisterende BeoSound 5-ejere” (*existing BeoSound 5 owners*) into “nuværende ejere af BeoSound 5” (*current owners of BeoSound 5*) (step 3). In the interview, the translator explained that she found that the latter was a more idiomatic Danish solution than the former, and that in this way she also avoided the hyphen between “5” and “ejere”. Finally, the translator changed “fokus på fortsat” (*focus on continuing*) into “fortsatte fokus” (*continued focus*) (step 4). The translator explained in the interview that she found the phrase “dedication to continuing customer service” a bit odd, and that normally, she would have discussed with the client what was meant by the expression. Here, she chose the translation which she found most likely.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator D	6	76%	Revise	Match-internal	In line with Bang & Olufsen’s dedication to continuing customer service, existing BeoSound 5 owners can easily add Spotify with a free online software update.
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Integrationen er indbygget i alle nye versioner af BeoSound 5, og i overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan		

		eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis onlinesoftwareopdatering. BT: The integration is integrated in all new versions of BeoSound 5, and in line with Bang & Olufsen's focus on continuing customer service can existing BeoSound 5 owners easily add Spotify via a free online software update.	
2	Selects "Integrationen er indbygget i alle nye versioner af BeoSound 5, og i" and deletes it by writing "I".	I overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis onlinesoftwareopdatering.	App. 6, D, ll. 686-688
3	Inserts a hyphen between "5" and "ejere". Selects "eksisterende" and deletes it by writing "nuværende ejere af". Deletes "-ejere".	I overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan nuværende ejere af BeoSound 5 nemt tilføje Spotify via en gratis onlinesoftwareopdatering.	App. 6, D, ll. 710-720
4	Places the cursor between "f" and "okus" in "fokus" and writes "ortsatte f". Selects "fortsat" and deletes it.	I overensstemmelse med Bang & Olufsens fortsatte fokus på kundeservice kan nuværende ejere af BeoSound 5 nemt tilføje Spotify via en gratis onlinesoftwareopdatering.	App. 6, D, ll. 690-706

The translator also stated that when she returned to the segment in the checking phase, she changed "kan nuværende ejere af BeoSound 5 nemt" (*can current owners of BeoSound 5 easily*) to "er det nemt for nuværende ejere af BeoSound 5 at" (*is it easy for current owners of BeoSound 5 to*) and divided the sentence into two sentences (by inserting a full stop after "Spotify" and writing "Det sker" (*It happens*) before "via"):

After the editing phase	After the checking phase
I overensstemmelse med Bang & Olufsens fortsatte fokus på kundeservice kan nuværende ejere af BeoSound 5 nemt tilføje Spotify via en gratis onlinesoftwareopdatering.	I overensstemmelse med Bang & Olufsens fortsatte fokus på kundeservice er det nemt for nuværende ejere af BeoSound 5 at tilføje Spotify. Det sker via en gratis onlinesoftwareopdatering.

The translator argued that it sounded better to write "er det nemt for nuværende ejere af BeoSound 5" than "kan nuværende ejere af BeoSound 5 nemt" and that in the former case, the phrase "via en gratis onlinesoftwareopdatering" (*via a free online software update*) was "hanging". Also, she explained that she thought it made good sense to separate the more technical explanation ("Det sker via en gratis onlinesoftwareopdatering") from the first part of the sentence.

Example 12-NL-C-10:

Translator C's process when revising segment 10 in the Newsletter is also an example of match-internal revision. The translator started out by writing "design" before "koncept", which had been left out by the MT engine. While writing "design", the translator was offered "designer" by the AutoSuggest function, but she did not accept it. After this, she selected "for nylig" (*recently*) and deleted it by writing "netop" (*just*) (step 2). In the interview, the translator explained that this made the text sound more up-to-date. The translator also stated that she was uncertain whether "stores" should be translated into "butikker" (*shops*) (as in the match) or "forretninger" (*stores*). She said that there was no help to be had from

the TM, which is interesting as she did not, for example, run a concordance search. She might have meant that there was no help to get from the termbase, which was true. She ended up retaining "butikker".

A bit later, while working with segment 11, the translator returned to segment 10 and copied "Bang & Olufsen", which she then inserted in segment 11 (step 3).

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator C	10	MT	Revise	Match-internal	Bang & Olufsen has just announced an all-new design concept for its stores.
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Bang & Olufsen har for nylig annonceret et helt nyt koncept for sine butikker. BT: Bang & Olufsen has recently announced a whole new concept for its shops.		App. 6, C, ll. 632-640
2	Writes "design" before "koncept". While writing "design", the translator is offered "designer" by the AutoSuggest function, but does not use it. Selects "for nylig" and deletes it by writing "netop".		Bang & Olufsen har netop annonceret et helt nyt designkoncept for sine butikker.		App. 6, C, ll. 641-651
3	Returns to this segment while working with segment 11 to copy "Bang & Olufsen".		Bang & Olufsen har netop annonceret et helt nyt designkoncept for sine butikker.		

5.2.2.2.3.3 Match-external revision

In the matches belonging to this subcategory, the translators made use of resources or functionalities external to the match (referred to as match-external actions) during revision. These were registered and categorized in the process analysis. In this section, the different external actions will first be defined. Next, in Section 5.2.2.2.3.3.1, results for all seven translators' use of match-external actions are provided and described, focusing on the different match types. Then, in Section 5.2.2.2.3.3.2, results for the individual translators' use of the different match-external actions are presented, differences in the translators' use of the different actions are addressed and process examples of the use of each action are provided.

The external actions used by the translators during the editing of the FAQ text and/or the Newsletter are defined in Figure 19.

Concordance search:	Search in the TM for one or more words using the concordance function.
Copy Source to Target:	Use of the Copy Source to Target function (where the match is replaced by the source segment) after the translator has revised the match.
Copy/Cut → Copy Source to Target → Insert:	Use of the Copy Source to Target function after the translator has copied or cut a part of the match (which might have been revised beforehand) and subsequent insertion of the copied or cut part into the target segment.
Termbase search:	Search in the client-specific termbase provided to the translators in the MT-assisted TM tool.
Google search:	Search in a web browser using Google.
Web page:	Visit to a web page coming up as the result of a Google search.
Search in online dictionary:	Search in a dictionary on the Internet.
Search in local dictionary:	Search in a dictionary installed on the translator's computer.
Reference text:	Consultation of the reference text with the fully formatted source text (only relevant in the FAQ text).
Pasting element copied from another segment:	Insertion of an element copied from another segment into the target segment.
Pasting element copied from the source segment:	Insertion of an element copied from the source segment into the target segment.

Figure 19. Match-external actions in revised matches

5.2.2.2.3.3.1 Match-external actions: A combined picture

Tables 34 and 35 provide a combined picture of the match-external actions carried out by all seven translators in revised matches in the FAQ text and the Newsletter, respectively. As illustrated in Section 5.2.2.2.3.1 (Tables 28 and 30), individual differences between the translators' use of match-internal and match-external revision were observed. Furthermore, the translators used a different number and different types of actions when revising by means of match-external revision. These individual differences are not visible in Tables 34 and 35. However, tables containing each individual translator's use of external actions in the different match types in both texts are included in Appendix 7, and differences in their use of external actions are addressed below before process examples are given.

As shown in Table 34, in the FAQ text, only four 100% matches were revised by means of match-external revision. In these four matches, the *reference text* was consulted twice³³ and in two cases, the *pasting element copied from another segment* action was used. Five 95-99% matches were revised by means of match-external revision. In this match type, the most frequently used external actions were *Google search* and *search in local dictionary*. Since translators may carry out more than one external action in one match, the total number of match-external actions in a match type may be higher than the number of matches revised by means of match-external revision. This was the case in the 95-99% match type where 16 match-external actions were carried out in the five matches revised by means of match-external revision. For example, Translator H carried out six of the eight *Google searches* in one 98% match. In 85-94% matches, the external action *concordance search* was most frequently used, whereas the *Copy/Cut → Copy Source to Target → Insert* action was most frequently used in 75-84% matches. In 70-74% matches, these two actions were used in an equal number of cases. In MT matches, *concordance search* was the external action most frequently used. This might be explained by translators wanting to check the MT suggestions against the contents in the TM, i.e. against texts translated for the same client. The *Copy/Cut → Copy Source to Target → Insert* action was the second most frequent action in MT matches. Also, in MT matches, apart from *termbase search*, all external actions were used at least once, whereas in each of the TM match types, a maximum of five out of the ten match-external actions were used. Thus, the translators used a wider range of external resources and functionalities in MT matches than in the other match types. However, it should be borne in mind here that the amount of data in each of the TM match types is much lower than in the MT matches and that another picture might have been evident if more TM matches revised by means of match-external revision had been present. In the FAQ text, in no cases were the *Google searches* followed by a translator visiting a *Web page* that came up as the result of such a search.

As shown in Table 35, in the Newsletter, only one 100% match was revised by means of match-external revision. In this match, a *local dictionary* was used. No 95-99% matches were revised by means of match-external revision. In 85-94%, 75-84%, 70-74% and MT matches, *concordance search* was the most frequently used external action. In 75-84%, 70-74% and MT matches, *Google search* was the second most frequent action. In MT matches, all external actions apart from one (*search in local dictionary*) were used at least once. Again, however, we need to note the low amount of data in the TM match types compared to the number of MT matches. In the Newsletter, the actions *Copy Source to Target* and *pasting element copied from the source segment* were not used.

³³ One of these times was Translator H's consultation of the reference text in segment 28 mentioned in Section 5.2.2.2.1 where the provided 100% match contained an incorrect deictic reference to an illustration in the text.

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy Source to Target	Copy/Cut → Copy Source to Target → Insert		Termbase search		Google search		Search online dictionary		Search in local dictionary		Reference text		Pasting element copied from another segment		Pasting element copied from the source segment	
100%	4	4	0	0%	0	0	0	0	0%	0	0	0	0%	0	0	2	50.0%	2	50.0%	0	0%
95-99%	5	16	2	12.5%	1	6.3%	0	0	0%	8	50.0%	0	0%	4	25.0%	1	6.3%	0	0%	0	0%
85-94%	10	13	9	69.2%	0	0%	1	7.7%	1	7.7%	0	0	0%	0	0%	1	7.7%	0	0%	1	7.7%
75-84%	5	5	1	20.0%	0	0%	3	60.0%	0	0	0	0	0%	0	0%	0	0%	0	0%	1	20.0%
70-74%	14	23	8	34.8%	0	0%	8	34.8%	0	0	0	0	0%	0	0%	1	4.3%	1	4.3%	5	21.7%
MIT	102	183	114	62.3%	3	1.6%	22	12.0%	0	14	7.7%	1	0.5%	2	1.1%	11	6.0%	1	0.5%	15	8.2%
In total	140	244	134	54.9%	4	1.6%	34	13.9%	1	22	9.0%	1	0.4%	6	2.5%	16	6.6%	4	1.6%	22	9.0%

Table 34. Match-external actions for all translators - FAQ text

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy/Cut → Copy Source to Target → Insert	Termbase search		Google search		Web page		Search online dictionary		Search in local dictionary		Pasting element copied from another segment	
100%	1	1	0	0%	0	0	0	0	0%	0	0	0	0%	1	100%	0	0%
95-99%	0	0															
85-94%	2	3	2	66.7%	0	0	0	0	0%	0	0	1	33.3%	0	0%	0	0%
75-84%	9	9	6	66.7%	0	0%	0	2	22.2%	0	0%	0	0%	0	0%	1	11.1%
70-74%	3	3	2	66.7%	0	0%	0	1	33.3%	0	0%	0	0%	0	0%	0	0%
MIT	48	109	74	67.9%	1	0.9%	1	18	16.5%	3	2.8%	2	1.8%	0	0%	10	9.2%
In total	63	125	84	67.2%	1	0.8%	1	21	16.8%	3	2.4%	3	2.4%	1	0.8%	11	8.8%

Table 35. Match-external actions for all translators - Newsletter

5.2.2.2.3.3.2 Match-external actions: Individual differences and process examples

Tables 34 and 35 provided a combined picture of all seven translators' use of external actions. However, as mentioned above, there were quite large individual differences between the translators, both in terms of the number of matches they revised using match-external revision and in terms of the number and types of match-external actions used. The pie charts in Figures 20 and 21 illustrate each individual translator's use of external actions across match types, i.e. without distinguishing between the types of matches in which the actions were used. However, Appendix 7 contains each translator's use of external actions in the different match types.

As shown in Figure 20, the number of external actions carried out by the translators varied from 16 for Translator C to 69 for Translator A in the **FAQ** text. One of the explanations for this difference is the number of matches which the translators each revised by means of match-external revision (which ranged from 11 for Translator B to 30 for Translator A), since if a translator revised more matches by means of match-external revision, he or she would also have used a higher number of match-external actions. Another part of the explanation seems to be the number of actions used per match. For instance, Translators A, B, E and H used on average around two match-external actions per match, whereas Translators C, D and G used just more than one per match.

As shown in Figure 21, the number of external actions used by the translators varied from 9 for Translators D and G to 39 for Translator A in the **Newsletter**. In line with the FAQ text, one of the explanations for this difference was that the number of matches which the individual translators revised by means of match-external revision varied (ranging from 5 for Translator D to 14 for Translator A), and that the translators used a different average number of actions per match (with, for example, Translator A using nearly three actions per match and Translator G a little more than one per match).

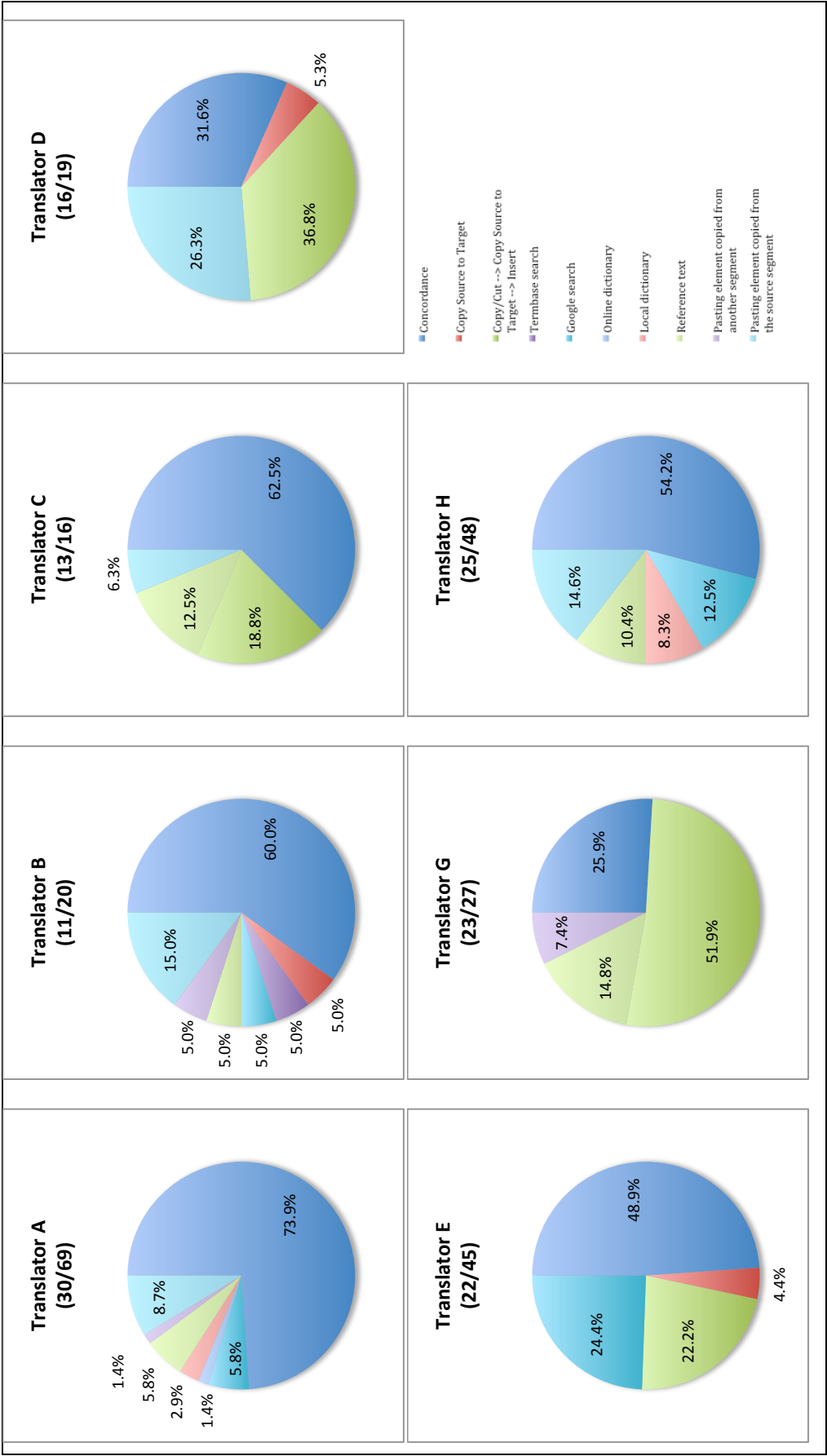


Figure 20. Match-external actions for each individual translator - FAQ text (Number of matches revised by means of match-external revision / match-external actions)

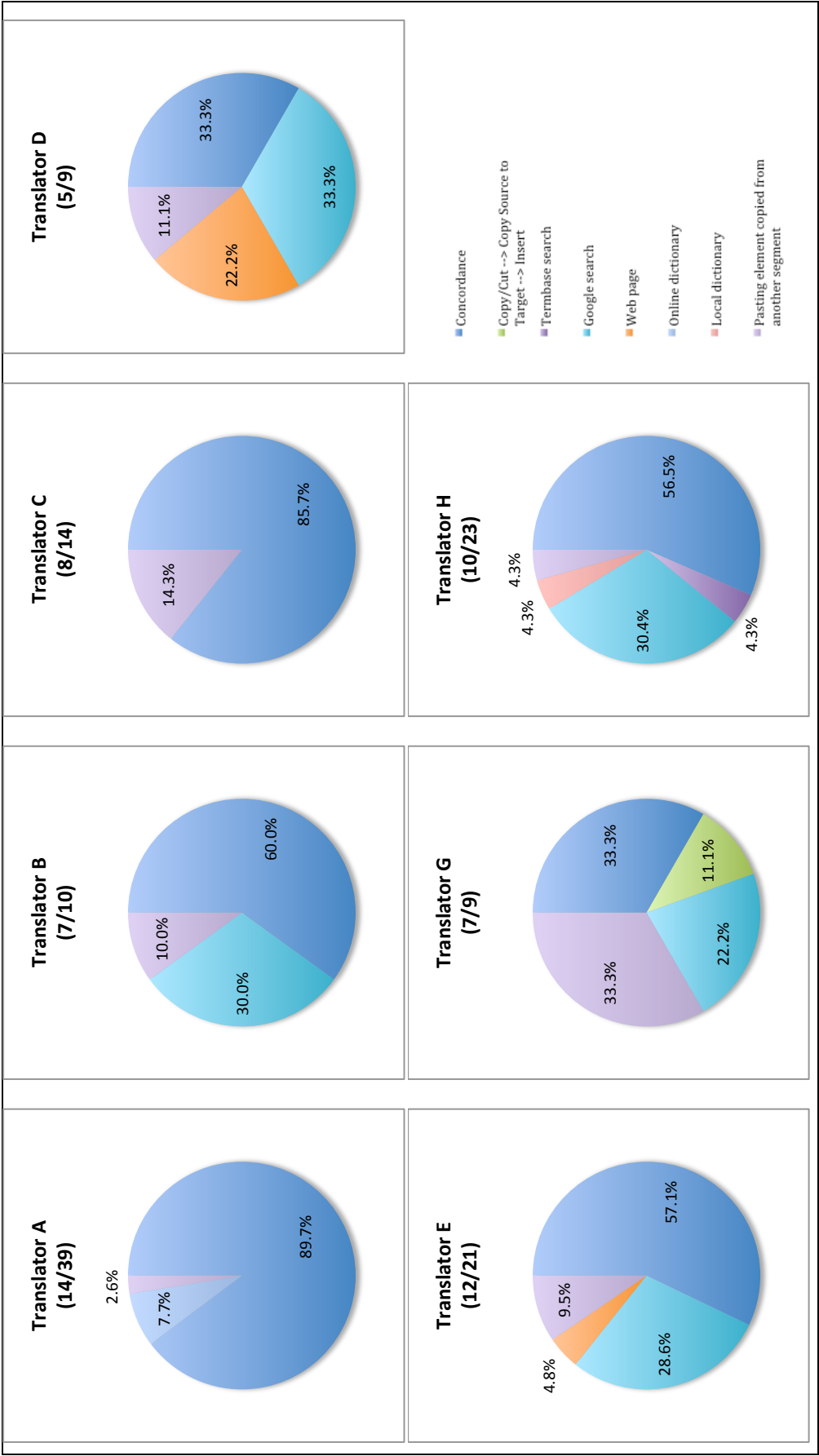


Figure 21. Match-external actions for each individual translator - Newsletter (Number of matches revised by means of match-external revision / match-external actions)

In the FAQ text, the external action *concordance search* was used by all translators, and for most of the translators (A, B, C, E and H), it was the external action most frequently used. In the Newsletter, the *concordance search* action was also used by all translators and again here, for Translators A, B, C, E and H, it was the action most frequently used. For Translators D and G, in both texts, the *concordance search* action was among the two most frequently used actions. Thus, for most of the translators, the *concordance search* was the preferred external action. In what follows, one example of the use of this action is provided from each of the texts.

Example 13-FAQ-B-2:

Translator B's translation of segment 2 is an example of match-external revision where the translator used the action *concordance search*. He started out selecting "set up" in the source segment and ran the concordance search (step 2), called a *spot search* in Valli's (2014) terms (cf. Section 2.3). In the retrospective interview, the translator explained that the verb was missing in the match (which is correct since "set up" had not been translated in the match), and that he wanted to check in the TM what Danish verb was normally used for "set up". After the concordance search, the translator wrote "konfiguer" between "jeg" and "BeoLab", deleted "uer" and wrote "urer" (which was still not correct; the correct form is "konfigurerer"). Also, he added a "så" (*then*) between "jeg" (*I*) and "anvende" (*use*) (step 3).

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator B	2	MT	Revise	Match-external	When I set up BeoLab 14 , should I use PL-A (PL1) or PL-B (PL-2)?
Match-external actions:		Concordance search			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Når jeg BeoLab 14 , skal jeg anvende PL-A (PL1) eller PL-B (PL-2)? BT: When I BeoLab 14, should I use PL-A (PL1) or PL-B (PL-2)?		
2	Selects "set up" in the source segment and runs a concordance search.		Når jeg BeoLab 14 , skal jeg anvende PL-A (PL1) eller PL-B (PL-2)?		App. 6, B, ll. 35-43
3	Writes "konfiguer" between "jeg" and "BeoLab", deletes "uer", writes "urer". Writes "så" between "jeg" and "anvende".		Når jeg konfigurerer BeoLab 14 , skal jeg så anvende PL-A (PL1) eller PL-B (PL-2)?		
4	Returns to this segment after having entered segment 51. Inserts a non-breaking space after "BeoLab" and deletes the space before "14".		Når jeg konfigurerer BeoLab 14 , skal jeg så anvende PL-A (PL1) eller PL-B (PL-2)?		

Later in the translation process, the translator returned to segment 2 and replaced the space between "BeoLab" and "14" with a non-breaking space (step 4), in accordance with the client preferences mentioned above in relation to Translator G's processes when editing segments 9 in the Newsletter and 39 in the FAQ text (examples 7-NL-G-9 and 9-FAQ-G-39). Translator B mentioned in the interview that he knew this preference because he also had experience of translating for Bang & Olufsen (cf. Section 5.1.3).

Example 14-NL-D-1:

Translator D used the match-external action *concordance search* twice in her match-external revision of segment 1 in the Newsletter. First, she ran a concordance search on “next generation retail concept”. However, no translation of that phrase was found in the TM. Then she ran a search on “next generation” which had been translated into “nye standarder” (*new standards*) and “nye generation” (*new generation*). In Valli’s (2014) terms, the two concordance searches constituted a search session, where the first search was reduced in the second through a right trim (cf. Section 2.3) (step 2). In the final step, the translator changed “næste generations lydsystem” (*next generation’s sound system*) to “ny generation af detailkoncept” (*new generation of retail concept*) (step 3). Here, she might have been inspired by the results of the second concordance search.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator D	1	MT	Revise	Match-external	BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept
Match-external actions:		Concordance search x 2			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		BeoSound 5 nu med Spotify Bang & Olufsen lancerer næste generations lydsystem BT: BeoSound 5 now with Spotify Bang & Olufsen launches next generation’s sound system		App. 6, D, ll. 617-659
2	Selects "next generation retail concept" in the source segment and runs a concordance search. Selects "next generation" in the source segment and runs a concordance search.		BeoSound 5 nu med Spotify Bang & Olufsen lancerer næste generations lydsystem		
3	Selects "næste generations lydsystem" and deletes it by writing "den nye generation af detailkoncepter". Deletes "den". Deletes "e" in "nye". Deletes "er" in "detailkoncepter".		BeoSound 5 nu med Spotify Bang & Olufsen lancerer ny generation af detailkoncept		

In the interview, the translator explained that because the segment was a headline, the translation should be punchy, elegant and short. She further said that later in the process (during the checking phase), she changed “ny generation af detailkoncept” (*new generation of retail concept*) to “nyt butikskoncept” (*new store concept*), because she wanted to keep the sentence short. She also stated that it is a general consideration for her when translating headlines that they are elegant and concise, and she explained that she sometimes has to deviate from the source text to reach a suitable solution. Thus, the translator’s thoughts about the segment’s function in the text influenced her choice of translation.

The action *Copy Source to Target* was only used in the FAQ text and only by Translators B, D and E. These were instances where the translators first revised the match and then replaced it with the source segment using the Copy Source to Target function. In a sense, this is a type of "rejection after revision" action, which somehow falls between two chairs in terms of the

accept/reject/revise categorization. However, according to the categorization criteria, these were assigned to the *revise* category, since they were revised before they were deleted. One could argue that these should have been left out of the analysis; however, it was a priority for me to obtain a full picture of the interaction and not only see what my categorization criteria allowed me to see. One example of the use of the *Copy Source to Target* action is provided.

Example 15-FAQ-E-40:

Translator E used the action *Copy Source to Target* in her revision of segment 40. Moreover, she used the action *concordance search*. She started out by writing the definite article “en” at the end of “støj” (*noise*). After pausing for approximately 7 seconds, the translator used the Copy Source to Target function, thus deleting what she had just written (step 2). In the interview, she said that she could not use the red “Line” in the tags and that she therefore copied the source to the target segment almost to start with. As explained above (in example 9-FAQ-G-39), “LINE” had probably been translated into “Line” because of the integration with the termbase. Afterwards, she wrote “Hvis støjen på” (*If the noise on*) in the beginning of the segment. While writing “støjen”, she was offered “støj” by the AutoSuggest function, but did not use it. Then she deleted “If the noise on the” (step 3). During the interview, the translator said that after she had used the Copy Source to Target function, she looked in the Translation Results window in the top of the screen, where the MT match was visible, to take what she could use, and found that she could use quite a lot.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator E	40	MT	Revise	Match-external	If the noise on the [tag]LINE[tag] or [tag]AMP[tag] signal is too high, the [tag]BeoLab 14[tag] will detect this as sound and not switch off.
Match-external actions:		Copy Source to Target + Concordance search			
Steps	Process description	Interim target segment			Interview
1	Wording of provided match	Hvis støj på[tag] Line[tag] eller AMP[tag][tag] signal er for høj, [tag]BeoLab 14[tag] bliver det registreret som lyd og ikke omskifter fra. BT: If noise on Line or AMP signal is too high, BeoLab 14 become it detected as sound and not switch off.			
2	Writes “en” at the end of “støj”. Uses Copy Source to Target.	If the noise on the [tag]LINE[tag] or [tag]AMP[tag] signal is too high, the [tag]BeoLab 14[tag] will detect this as sound and not switch off.			App. 6, E, ll. 205-209
3	Writes “Hvis støjen på” in the beginning of the segment. While writing “støjen”, the translator is offered “støj” by the AutoSuggest function, but does not use it. Deletes “If the noise on the”.	Hvis støjen på [tag]LINE[tag] or [tag]AMP[tag] signal is too high, the [tag]BeoLab 14[tag] will detect this as sound and not switch off.			App. 6, E, ll. 210-219
4	Writes “eller” before “or”, deletes “or”. Inserts a hyphen after “LINE” and the tag. Inserts a hyphen after	Hvis støjen på [tag]LINE[tag]- eller [tag]AMP[tag]-signalet is too high, the [tag]BeoLab 14[tag] will detect this as			

	"AMP" and the tag. Deletes the space between "AMP-" and "signal". Writes "et" at the end of "AMP-signal".	sound and not switch off.	
5	Writes "er for høj" after "AMP-sig-nalet". Deletes "is too high". Writes "registrerer" before "the", then deletes "the". Writes "det som lyd og" after "14". Selects "will detect this as sound and not" and deletes it.	Hvis støjen på [tag]LINE[tag]- eller [tag]AMP[tag]-sig-nalet er for høj, registrerer [tag]BeoLab 14[tag] det som lyd og switch off.	App. 6, E, ll. 220-224
6	Selects "switch off" in the source segment and runs a concordance search. Opens a folder on the computer, but does not do anything with it. Returns to the translation. Places the cursor between "s" and "witch" in "switch" and writes "lukker". Selects "witch off" and deletes it.	Hvis støjen på [tag]LINE[tag]- eller [tag]AMP[tag]-sig-nalet er for høj, registrerer [tag]BeoLab 14[tag] det som lyd og slukker.	App. 6, E, ll. 225-230

Next, the translator wrote "eller" (*or*) and deleted "or". After this, she inserted hyphens after "LINE" and "AMP", deleted the space between "AMP-" and "signal" (*signal*) and wrote "et" at the end of "AMP-signal" to change it to the definite form (step 4). Afterwards, the translator wrote "er for høj" (*is too high*) and deleted "is too high". Then she wrote "registrerer" (*detects*), deleted "the" and wrote "det som lyd og" (*it as sound and*) before deleting "will detect this as sound and not" (step 5). In the interview, I observed that she changed the structure of the sentence (compared to the match), which she confirmed. In the final step, the translator ran a concordance search for "switch off". Then she placed the cursor between "s" and "witch" in "switch" and wrote "lukker" before deleting "witch off" (step 6). In the interview, before we saw this on the screen, she told me that she wrote "slukker ikke" (*not switches off*) instead of "omskifter fra" (*switch off*). However, in fact, she only wrote "slukker" (*switches off*), which changed the meaning of the sentence. Generally, after using the Copy Source to Target function, the translator alternated between deleting parts of the source text and typing her Danish translation.

In the FAQ text, the action Copy/Cut → Copy Source to Target → Insert was used by Translators C, D, E and G. In the Newsletter, only Translator G used this action. As explained in Figure 19 above and as indicated by the name of the action, this type of external action includes two variants, namely the Copy → Copy Source to Target → Insert and the Cut → Copy Source to Target → Insert variant. When using this action, the translators copied or cut a part of the match in the target segment (which might have been revised beforehand), used the Copy Source to Target function to replace the match with the source segment, and subsequently inserted the copied or cut part of the match into the target segment. The result of using the two variants was the same as the translated match ended up being a combination of the proposed match and the source segment in question.³⁴

³⁴ When the Cut → Copy Source to Target → Insert variant is used, the match is necessarily revised before the source segment is inserted into the target segment in the sense that a part of the match is cut and thus removed from the match. However, in the Copy → Copy Source to Target → Insert variant, the translator might revise the match before copying a part of it or he or she might copy a part of the match without changing it beforehand, and thus, strictly speaking, not revise the match as such. However, both variants were seen as instances of

An interesting aspect of the use of this external action (in its two variants) is that, in the FAQ text, it always occurred in segments where the source segment either 1) contained a word which should remain untranslated in the target segment (formatted in red) (C19, C20, C23, D19, D20, D21, D37, D43, D46, D71, E3, E9, E14, E19, E20, E21, E23, E37, E71, G3, G9, G14, G19, G20, G21, G23, G37, G52 and G71) or 2) contained a visual element that had not been transferred to the match (E63, G55, G58, G60 and G63). In both cases, part(s) of the source segment could be transferred directly to the target segment, i.e. used in the translation in an unchanged form, which might explain the use of the Copy Source to Target function. In the retrospective interviews, Translators C, E and G touched upon this. Translator C explained that she sometimes uses this strategy when she can use a part of the match and when she is uncertain whether she is able to remember it after having replaced the match with the source segment. Translator E said that she cuts the part she is certain she can use in the translation, and that she inserts the source segment in the match to make sure that all tags are correctly placed in the target segment. Translator G also elaborated on his use of this action which is mentioned in the process example below (example 16-FAQ-G-19). Interestingly, Translators C, D and G only applied the variant, where a part of the match was first *copied*, whereas Translator E only applied the variant, where a part of the match was first *cut*. In the Newsletter, Translator G used the *Copy/Cut – Copy Source to Target – Insert* action in segment 22. Here, it was also used in a segment where elements could be transferred directly to the translation and, as in the FAQ text, he used the variant where a part of the match was first copied (see example 17-NL-G-22). Thus, it seems that, for some translators, certain source-text elements trigger the use of a particular match-external action. When the segments in the FAQ text in which the *Copy/Cut → Copy Source to Target → Insert* action was used are compared with the matches which were rejected in this text (cf. Section 5.2.2.2.2), we find further support for this assumption, since it is clear that in segments 23, 52, 55, 58, 60, 63 and 71, all four translators (C, D, E and G) either rejected the matches using Copy Source to Target or carried out the *Copy/Cut → Copy Source to Target → Insert* external action. Thus, in these segments (all of which contained either a word that should remain untranslated in the target text or a visual element), all four translators chose to use the Copy Source to Target function either to begin with or after having cut or copied a part of the match. From a MT development perspective, it seems natural to ask whether some of these actions could have been avoided if the words which were not to be translated had been included in the termbase and thus used for the training of the MT engine, and if tags were included in the MT matches. However, this speculation requires further investigation in a follow-up study. In the following, a process example of the use of the action *Copy/Cut → Copy Source to Target → Insert* is provided from each of the texts.

Example 16-FAQ-G-19:

Translator G used the *Copy/Cut → Copy Source to Target → Insert* action in his match-external revision of the match in segment 19. He first selected “Hvordan ændrer jeg indstillingerne på” (*How do I change the settings on*) in the match and copied it. Then he

match-external revision, since the translators used a part of the match as well as made use of a source external to the match (the source segment) in order to reach the final translation.

used the Copy Source to Target function, replacing the match with the source segment (step 2). Next, he selected “How do I adjust the sound settings on my” and replaced it with “Hvordan ændrer jeg indstillingerne på” (*How do I change the settings on*). He then replaced the space between “BeoLab” and “14” with a non-breaking space to comply with the client preference mentioned above (step 3). In the interview, the translator said that “again”, something had been left out in the match (the translation of “sound”), probably referring back to his translation of segment 15 where he also mentioned that something had been left out in the MT match. He explained that he copied the Danish part of the sentence, because he could reuse it, adding that there was no reason for him to write it again. He also explained that his use of the Copy Source to Target function is an “old habit”, which he uses to ensure that the formatting is the same in the source and the target segment and to save himself from unnecessary typing. He also added that the translators at TextMinded are used to being careful when something is formatted in bold, italics, red etc., and that he was trying to avoid problems in the generation of the final target text file and therefore tried to stay close to the source layout.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator G	19	71%	Revise	Match-external	How do I adjust the sound settings on my BeoLab 14?
Match-external actions:		Copy/Cut → Copy Source to Target → Insert			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Hvordan ændrer jeg indstillingerne på Beolit [®] 14? BT: How do I change the settings on Beolit 14?		
2	Selects "Hvordan ændrer jeg indstillingerne på" and copies it. Uses Copy Source to Target.		How do I adjust the sound settings on my BeoLab 14?		App. 6, G, ll. 78-114
3	Selects "How do I adjust the sound settings on my" and inserts "Hvordan ændrer jeg indstillingerne på". Selects the space between "BeoLab" and "14" and replaces it with a non-breaking space.		Hvordan ændrer jeg indstillingerne på BeoLab [®] 14?		
4	Returns to this segment after having made a change in segment 2. Writes "lyd" before "indstillingerne".		Hvordan ændrer jeg lydindstillingerne på BeoLab [®] 14?		

Translator G also said that he remembered that he had forgotten to insert the non-breaking space in “BeoLab 14” in segment 2, which he then inserted after step 3. After inserting the non-breaking space in segment 2, he returned to segment 19 and wrote “lyd” (*sound*) before “indstillingerne” (*the settings*), i.e. the translation of “sound”, which had been left out (step 4).

Example 17-NL-G-22:

As mentioned above, in the Newsletter, the *Copy/Cut* → *Copy Source to Target* → *Insert* action was only used once, namely by Translator G in the translation of segment 22, which is an MT match. Translator G first selected “vinder den eftertragtede” (*wins the coveted*) and copied it. Then he used Copy Source to Target and the match was replaced with the source segment (step 2). He then inserted a non-breaking space between “B&O” and “PLAY”, wrote “fjernsyn” (*television*) and inserted “vinder den eftertragtede” (*wins the coveted*) (step 3). Finally, the translator deleted “television wins coveted” and wrote “pris” (*prize*) before he inserted non-breaking spaces between “red” and “dot” and between “dot” and “award” (step 4). In this way, the final translation ended up being a combination of the match provided (*vinder den eftertragtede*), the source segment (*B&O PLAY* and *red dot award*) and elements typed and inserted by the translator (*pris* and the non-breaking spaces). Even though this action was only used once in the Newsletter, it is interesting to note that it was used in a segment that contained elements that could be transferred directly to the translation (*B&O PLAY* and *red dot award*) as was the case with many of these actions in the FAQ text. During the checking phase, the translator entered segment 22 again, where he deleted “fjernsyn” (*television*) and wrote “tv” (*TV*) instead.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator G	22	MT	Revise	Match-external	B&O PLAY television wins coveted red dot award
Match-external actions:		Copy/Cut → Copy Source to Target → Insert			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		B&O afspille tv vinder den eftertragtede rød prik pris BT: B&O play tv wins the coveted red dot award		N/A
2	Selects "vinder den eftertragtede", copies it and uses Copy Source to Target.		B&O PLAY television wins coveted red dot award		
3	Selects the space between "B&O" and "PLAY" and replaces it with a non-breaking space. Writes "fjernsyn" before "television" and inserts "vinder den eftertragtede".		B&O°PLAY fjernsyn vinder den eftertragtede television wins coveted red dot award		
4	Deletes "television wins coveted". Writes "pris" before "red". Selects the space between "red" and "dot" and replaces it with a non-breaking space. Selects the space between "dot" and "award" and replaces it with a non-breaking space.		B&O°PLAY fjernsyn vinder den eftertragtede pris red°dot°award		

Above, the action *termbase search* was defined as occurring where the translators search in the client-specific termbase provided in the MT-assisted TM tool. Only one termbase search was carried out in each of the texts, namely by Translator B in segment 16 in the FAQ text and by Translator H in segment 11 in the Newsletter. Thus, the study indicates that termbase searches are not a frequent type of match-external action. This may have different explanations. One plausible explanation is that terms contained in the termbase are highlighted in the source segment and the term entries are automatically displayed (by

means of *active terminology recognition*, cf. Section 2.3). This means that the translators can see relevant termbase entries without actively searching in the termbase and, conversely, they know that if a term is not highlighted, it is not included in the termbase. Another explanation might be that the translators would rather use the concordance search and see potential translations in context. In the following, the segments in which the *termbase search* action was used are exemplified.

Example 18-FAQ-B-16:

In segment 16 in the FAQ text, Translator B used the action *termbase search*. In the same segment, he also used the actions *reference text* (the use of this action is addressed below) and *concordance search*. The translator started out by consulting the reference text where the sentence in question was visible. After returning to SDL Trados Studio, he selected “Quick guide” in the source segment and ran a concordance search. After scrolling through the concordance search results (showing the translations “kort vejledning” (*short guide*) and “hurtigvejledning” (*quickguide*)), the translator typed “quick guide” in the termbase search window and ran a search, which, however, returned no results (step 2). After this, the translator wrote “den korte vejledning” (*the short guide*) and deleted “onlinevejledningen” (*the online guide*) (step 3). This segment was not brought up during the retrospective interview.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator B	16	91%	Revise	Match-external	See the Quick guide for more information.
Match-external actions:		Reference text + Concordance search + Termbase search			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Se yderligere oplysninger i onlinevejledningen. BT: See more information in the online guide.		N/A
2	Consults the reference text. Selects “Quick guide” in the source segment and runs a concordance search. Searches in the termbase for “quick guide”.		Se yderligere oplysninger i onlinevejledningen.		
3	Writes “den korte vejledning” between “i” and “onlinevejledningen”. Deletes “onlinevejledningen”.		Se yderligere oplysninger i den korte vejledning.		

Example 19-NL-H-11:

In her revision of segment 11, Translator H used the actions *termbase search* and *concordance search*. During the translation process, when editing segment 11, the translator said to me that “this is such a good sentence for critics of MT” and read segment 11 out loud. This I noted in the observation protocol. During the retrospective interview, I mentioned this to Translator H, and she said that the MT match was really bad and that it was an example of MT at its worst, adding that the MT system translated the words one by one and joined them irrespective of whether they fitted together or not. She added that the translators at TextMinded like to laugh about sentences like this one.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator H	11	MT	Revise	Match-external	Experiencing the brand's acoustic innovations first-hand has never been more accessible or compelling.
Match-external actions:		Termbase search + Concordance search x 3			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Opleve den brand akustiske nyskabelser det har aldrig været nemmere lydfrenten. BT: Experience that brand acoustic innovations it has never been easier the sound front.		App. 6, H, ll. 511-540
2	Uses the termbase search to search for "brand". Selects "the brand's" in the source segment and runs a concordance search. Writes "Derfor kan kunderne nu opleve Bang & Olufsens" in the beginning of the segment. Deletes "Opleve den brand".		Derfor kan kunderne nu opleve Bang & Olufsens akustiske nyskabelser det har aldrig været nemmere lydfrenten.		App. 6, H, ll. 545-575
3	Selects "first-hand" in the source segment and runs a concordance search. Selects "compelling" in the source segment and runs a concordance search. Writes "er det nu blevet endnu lettere for kunderne nu opleve Bang & Olufsens akustiske nyskabelser det har aldrig været nemmere lydfrenten". Deletes "r", writes "lettere d". Deletes "d", writes "for". Deletes "kan".		Derfor er det nu blevet endnu lettere for kunderne nu opleve Bang & Olufsens akustiske nyskabelser det har aldrig været nemmere lydfrenten.		App. 6, H, ll. 576-615
4	Selects "nu" and deletes it by writing "at". Selects "det har aldrig været nemmere lydfrenten" and deletes it.		Derfor er det nu blevet endnu lettere for kunderne at opleve Bang & Olufsens akustiske nyskabelser.		

When revising the match, the translator started out by using the termbase search to search for "brand". The search returned two results: "brand" (*brand*) and "varemærke" (*trademark*). Interestingly, the term entry was automatically displayed in the termbase window when the translator entered the segment, and "brand" was highlighted in the source text, but the translator carried out the termbase search anyway. Next, the translator selected "the brand's" in the source segment and ran a concordance search. After this, the translator wrote "Derfor kan kunderne nu opleve Bang & Olufsens" (*Therefore the customers can now experience Bang & Olufsen's*) and deleted "Opleve den brand" (*Experience that brand*) (step 2). In the interview, the translator explained that she used the concordance search to find out which of the two termbase results ("brand" and "varemærke") was more frequently used by Bang & Olufsen, adding that they were currently experiencing a problem at TextMinded with the termbase as it did not indicate so-called "forbidden terms", i.e. terms that must not be used. The translator was uncertain whether one of the two terms was forbidden and thus carried out the concordance search. She also stated that she was a bit sceptical because she knew there had been a problem with the Bang & Olufsen termbase, which might also explain why she carried out the termbase search even though the termbase entry was already displayed.

Next, the translator selected “first-hand” in the source text and ran a concordance search before selecting “compelling” and running another concordance search. The translator then wrote “er det nu blevet endnu lettere for” (*has it now become even easier for*) and deleted “kan” (*can*), thus changing the structure in the first part of the sentence (step 3). In the interview, Translator H explained that the sentence was not only difficult to translate for the translation tool, but also for the translator, adding that she had to think a bit about it. Furthermore, she said that it needed to sound catchy and nice in order to lure customers into the store. Thus, the translator’s thoughts about the context and purpose of the translation influenced her process. Interestingly, the translator added that it is useful that the MT tool helps with translating the trivial parts, leaving her time for the more creative parts. In the last step, the translator selected “nu” (*now*) and deleted it by writing “at” (*to*). She then selected “det har aldrig været nemmere lydfrenten” (*it has never been easier the sound front*) and deleted it (step 4).

In the FAQ text, the action *Google search* was used by Translators A, B, E and H. In the Newsletter, it was used by Translators B, D, E, G and H. The translators primarily used Google to search for possible Danish translations of terms in the English source text as well as for checking the frequency of specific phrases in Danish. In the FAQ text, three of the Google searches were in *Google Images*, whereas no searches in Google Images were observed in the Newsletter. In the FAQ text, in no cases were the Google searches followed by a translator visiting a *Web page* that came up as a result of such a search, whereas in the Newsletter, Translator D did this twice and Translator E once. Thus, the study shows that in most cases translators found it sufficient to search using Google and only in a few cases did they need to go beyond Google and carry out further research. Jiménez-Crespo refers to using Google to check a term or a phrase directly as using the “Web as Corpus” (2015, p.47).

In the retrospective interview, Translator H said that when she translates texts that are outside her usual areas of expertise, she typically runs Google searches. She added that she often thinks about what she would have done if she did not have the Internet, and that if that were the case, she would be in trouble. Translator E said that the problems she had in the translation were solved by “classical Google search”. During my first stay at TextMinded, Translator B also mentioned that he “liked Google searches” and in his retrospective interview he said that he had not run that many Google searches during the experiment, but that there often would be a lot. In the following, a process example of the use of the action *Google search* is given from the FAQ text, and an example of the action *Google search* followed by a visit to a *Web page* is given from the Newsletter.

Example 20-FAQ-E-61:

Translator E used the actions *Google search* and *concordance search* during her match-external revision of segment 61. The translator started out by going to Google and running a search for “beolab 14”. Shortly after running the search, the translator went to Google Images, where images of the product were displayed (cf. Figure 22).

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator E	61	MT	Revise	Match-external	Disconnect [tag]BeoLab 14[tag] from the mains, then reconnect it to the main again.
Match-external actions:		Google search + Concordance search			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Afbryd[tag] BeoLab 14[tag] fra lysnet, og sæt den i igen. BT: Disconnect BeoLab from the mains, and set it in again.		
2	Goes to Google and searches for "beolab 14". Goes to "Google Images". Selects "reconnect" in the source segment and runs a concordance search.		Afbryd[tag] BeoLab 14[tag] fra lysnet, og sæt den i igen.		App. 6, E, ll. 289-303
3	Places the cursor before "sæt" and writes "tis", deletes "s", writes "Islut". Deletes "sæt". Deletes "i".		Afbryd[tag] BeoLab 14[tag] fra lysnet, og tilslut den igen.		

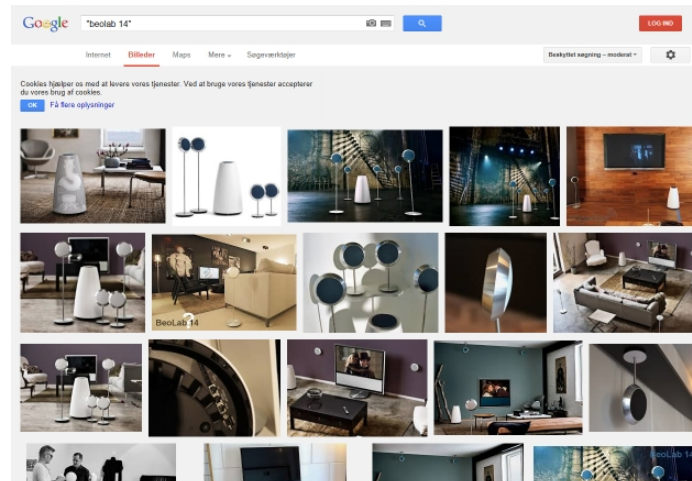


Figure 22. Process example 20-FAQ-E-61 - Google search

In the retrospective interview, the translator said that she wanted to check whether BeoLab 14 was a loudspeaker or something else. Furthermore, she said that somewhere in the text, the product was referred to as "din beolab 14" (*your beolab 14*) or "min beolab 14" (*my beolab 14*) and if it was something other than a loudspeaker, it might have to be changed to "dit" or "mit" (because of the gender of the noun).

After this, the translator returned to SDL Trados Studio, selected "reconnect" in the source segment and ran a concordance search (step 2). Then, the translator wrote "tilslut" (*connect*) and deleted "sæt" (*set*) and "i" (*in*) (step 3). In the checking phase, the translator entered segment 61 again and wrote "tet" at the end of "lysnet" (*main*), changing it to the definite form, "lysnettet" (*the mains*).

Example 21-NL-D-13:

Translator D made use of the external actions *concordance search*, *Google search* and *Web page* in her match-external revision of segment 13. First, she selected "flagship store" in the

source segment and ran a concordance search, which returned no results for that particular phrase. She then deleted “gemme” (*hide*) (step 2), which is a Danish translation of the English verb “store”. The verb “store” was a term entry in the termbase and the translation “gemme” was thus used in the MT match, although in the source segment “store” is obviously a noun and not a verb.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator D	13	MT	Revise	Match-external	The new retail concept will be launched in Bang & Olufsen's new flagship store in Copenhagen on 18 April.
Match-external actions:		Concordance search + Google search + Web page			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Det nye designkoncept lanceres i Bang & Olufsen's nye flagskib gemme i København den 18. april. BT: The new design concept is launched in Bang and Olufsen's new flagship hide in Copenhagen on 18 April.		N/A
2	Selects "flagship store" in the source segment and runs a concordance search. Selects "gemme" and deletes it.		Det nye designkoncept lanceres i Bang & Olufsen's nye flagskib i København den 18. april.		
3	Goes to Google and runs a search for "flagskibsbutik". Clicks on the title "Se billederne: Her er B&O's nye flagskibsbutik i København". Returns to the translation file and writes "sbutik" at the end of "flagskib".		Det nye designkoncept lanceres i Bang & Olufsen's nye flagskibsbutik i København den 18. april.		

After this, the translator went to Google, ran a search for “flagskibsbutik” (*flagship store*) and clicked on one of the Web pages, which came up as the result of the search and which had the title “Se billederne: Her er B&O's nye flagskibsbutik i København” (*See the pictures: Here is B&O's new flagship store in Copenhagen*) (cf. Figure 23). After this, where it seems that the translator found verification for her solution, she returned to SDL Trados Studio and wrote “sbutik” (*sstore*) at the end of “flagskib” (*flagship*) (step 3). During the checking phase, the translator entered segment 13 again and deleted the apostrophe in “Olufsen's”.

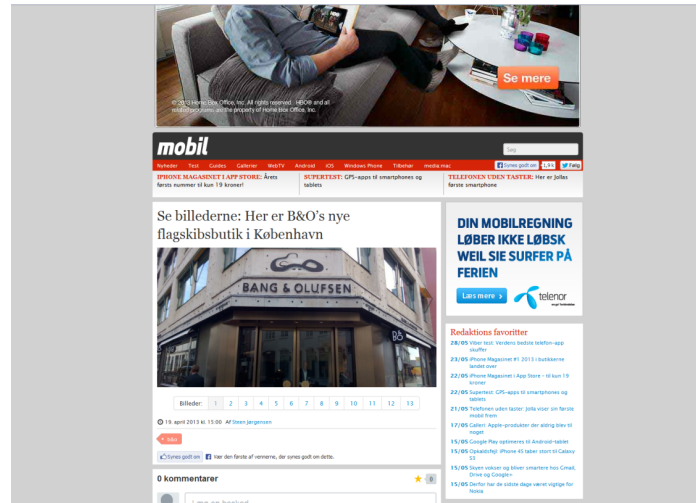


Figure 23. Process example 21-NL-D-13 - Web page

The actions *search in online dictionary* and *search in local dictionary* were not frequently used. In both the FAQ text and the Newsletter, Translators A and H were the only translators to search in dictionaries, online or local. In the FAQ text, Translator A searched once in an online dictionary and once in each of two local dictionaries, and Translator H searched twice in two local dictionaries. All of their searches revolved around the translation of "bass position knob" and "position knob" in segments 23 and 25. In the Newsletter, Translator A used one online dictionary three times (to search for "announce", "compelling" and "captivate") and Translator H used a local dictionary to search for "unswerving". Thus, the study shows that dictionaries (online or local) are not frequent match-external actions for the translators. It should also be noted here that no consultation of printed dictionaries was observed. In the following, an example of the use of a local dictionary is given from the FAQ text and an example of the use of an online dictionary is given from the Newsletter.

Example 22-FAQ-H-23-25:

The following example comprises more than one segment, namely Translator H's revision of segments 23, 24 and 25. The translator went back and forth between the segments, seemingly because of the terms "bass position knob" and "position knob". The translator used the external actions *reference text* and *concordance search* in segment 23 and *concordance search*, *search in local dictionary* and *Google search* in segment 25. The translator's process in all three segments is illustrated in the following since the external actions seem to be related, revolving around the same term.

Upon entering segment 23, Translator H found the corresponding spot in the reference text before selecting "bass position knob" in the source segment and running a concordance search. The search returned no results for this term and the translator then ran a search for "position knob", which also returned no results. The translator then ran a third concordance search for "knob", which returned a match where "the knob" was translated into "knoppen" (*the knob*) (step 2). (*Example continued after the table*)

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator H	23	MT	Revise	Match-external	How should I set the bass position knob (FREE , WALL , CORNER) on BeoLab 14 ?
Match-external actions:		Reference text + Concordance search x 3			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Hvordan skal jeg indstille bass positionsknappen (FRI , WALL , HJØRNE) på BeoLab 14 ? BT: How should I set the bass position knob (FREE , WALL , CORNER) on BeoLab 14 ?		N/A
2	Finds the corresponding spot in the reference text. Selects "bass position knob" in the source segment and runs a concordance search. The translator deletes "bass" in the concordance search window and runs a search for "position knob". The translator deletes "position" in the concordance search window and runs a search for "knob".		Hvordan skal jeg indstille bass positionsknappen (FRI , WALL , HJØRNE) på BeoLab 14 ?		

After this, the translator placed the cursor in segment 24 and paused for approximately 27 seconds before placing the cursor in segment 25. (*Example continued after the table*)

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator H	24	79%	Revise	Match-internal	The setting of the bass position knob is based on the number of surfaces the subwoofer is in close proximity of.
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Indstillingen af omskifteren POS. afhænger af det antal overflader, som subwooferen står i nærheden af (inden for 50 cm). BT: The setting of the switch POS. depends on the number of surfaces the subwoofer stands close to (within 50 cm).		N/A

After placing the cursor in segment 25, the translator selected “position knob” in the source segment and ran a concordance search, thus repeating one of the searches from segment 23. Then she opened a local dictionary (*Gyldendals Røde Ordbøger*) and searched first on “position knob” (with no results) and then on “knob” (results: "knop" + "dup" + "kugle" + "knap"). Then the translator opened another local dictionary (*L&H Engelsk*) and searched on “position knob” (with no results) and then on “knob” (results: "greb" + "knap" + "knop" + "kuglegreb" + "kuglehåndtag"). Afterwards, the translator went to Google and searched for “basknap” (*bass knob*), “basknappen” (*the bass knob*), “baspositionsknappen” (*the bass position knob*), “beolab 14 basknap” (*beolab 14 bass knob*), “beolab 14 baspositionsknop” (*beolab 14 bass position knob*) and “beolab baspositionsknop” (*beolab bass position knob*) (step 2).

In the interview, I accidentally asked the translator for comments on segment 23 but then read the match in segment 25 out loud instead, telling her that I believed she ran some Google searches there. Translator H answered that she believed she did that when she encountered the term “bass position knob” for the first time (in segment 23), which was not actually the case. However, she explained that she could not find the term in the concordance (as indicated above) and that she then ran some Google searches on possible translations and also looked up words in dictionaries. She then told me that she ended up with the translation “basknappen” (*the bass knob*), because she searched for different solutions together with “bang & olufsen” (which was, in fact, “beolab 14”). She explained that there were not “4000 hits on it”, but that she felt that “baspositionsknappen” (*the bass position knob*) sounded off and that the right term was probably just “basknappen” (*the bass knob*). She further explained that the first searches returned many pages in languages other than Danish, which implies that they were not useful for her. Finally, the translator saw on the screen that she had searched for “beolab 14” and “basknap” (*bass knob*), adding that it returned results from pages where people sell their used things, which was not, according to the translator, entirely valid. (Example continued after the table)

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator H	25	98%	Revise	Match-external	Use the position knob to filter out the natural bass change obtained if the subwoofer is placed, for example, in a corner, as compared to a more freestanding position.
Match-external actions:		Concordance search + Local dictionary x 4 + Google search x 6			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Brug positionsomskifteren til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit. BT: Use the position switch to filter out changes in the bass reproduction as a result of the subwoofer e.g. being placed in a corner instead of freely.		
2	Selects "position knob" in the source segment and runs a concordance search. The translator opens a local dictionary (Gyldendals Røde Ordbøger) and searches for "position knob". The translator then searches for "knob". The translator opens another local dictionary (L&H Engelsk) and searches for "position knob". The translator searches for "knob". The translator goes to Google and searches for "basknap". Searches for "basknappen". Searches for "baspositionsknappen". Searches for "beolab 14 basknap". Searches for "beolab 14 baspositionsknapp".		Brug positionsomskifteren til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.		App. 6, H, ll. 159-213

Searches for "beolab baspositionsknapp".

After running these searches in segment 25, the translator returned to segment 23. Here, she changed “bass positionsknappen” (*the bass position knob*) to “basknappen” (*the bass knob*), thus implementing the terminological decision she had made on the basis of the different external actions (step 2). In steps 3 and 4, she changed “(FRI , WALL , HJØRNE)” ((*FREE , WALL , CORNER*)) to “(FREE, WALL, CORNER)” and deleted the space between “14” and “?”. Interestingly, the MT engine had translated “FREE” and “CORNER” into Danish, but not “WALL”. In any case, the translator had to change “FRI” and “HJØRNE” back into English since these were marked in red. (*Example continued after the table*)

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator H	23	MT	Revise	Match-external	How should I set the bass position knob (FREE , WALL , CORNER) on BeoLab 14?
Match-external actions:		Reference text + Concordance search x 3			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Hvordan skal jeg indstille bass positionsknappen (FRI , WALL , HJØRNE) på BeoLab 14 ? BT: How should I set bass position knob (FREE , WALL , CORNER) on BeoLab 14 ?		N/A
2	Places the cursor between "bas" and "s" in "bass". Writes "knappen". Selects "s positionsknappen" and deletes it.		Hvordan skal jeg indstille basknappen (FRI , WALL , HJØRNE) på BeoLab 14 ?		
3	Deletes the space between "(" and "FRI". Places the cursor between "FR" and "I" in "FRI" and writes "EE". Deletes "I".		Hvordan skal jeg indstille basknappen (FREE , WALL , HJØRNE) på BeoLab 14 ?		
4	Deletes the space between "WALL" and the comma. Places the cursor before "HJØRNE" and writes "CORNER". Deletes "HJØRNE" and the space between "CORNER" and ")". Deletes the space between "14" and "?".		Hvordan skal jeg indstille basknappen (FREE , WALL, CORNER) på BeoLab 14 ?		

After this, the translator proceeded to segment 24, where she changed “omskifteren POS.” (*the switch POS.*) to “basknappen” (*the bass knob*). When writing “basknappen”, she was offered “base” by the AutoSuggest function, but did not use it. She then deleted “(inden for 50 cm).” ((*within 50 cm.*)) and inserted a full stop after “af” (*of*) (step 2) before proceeding to segment 25. (*Example continued after the table*)

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator H	24	79%	Revise	Match-internal	The setting of the bass position knob is based on the number of surfaces the subwoofer is in close proximity of.

Steps	Process description	Interim target segment	Interview
1	Wording of provided match	Indstillingen af omskifteren POS. afhænger af det antal overflader, som subwooferen står i nærheden af (inden for 50 cm). BT: The setting of the switch POS. depends on the number of surfaces which the subwoofer stands close to (within 50 cm).	N/A
2	Places the cursor before "omskifteren" and writes "basknappen". When writing "basknappen", the translator is offered "base" by the AutoSuggest function, but does not use it. Deletes "omskifteren POS.". Deletes "(inden for 50 cm)". Inserts a full stop after "af".	Indstillingen af basknappen afhænger af det antal overflader, som subwooferen står i nærheden af.	

Having entered segment 25, the translator changed "positionsomskifteren" (*the position switch*) into "basknappen" (*the bass knob*) (step 2). Finally, she wrote "naturlige" (*natural*) between "bortfiltrere" (*filter out*) and "ændringer" (*changes*) (step 3). Thus, by using a number of different external actions, the translator reached a decision as to the translation of "(bass) position knob" and then ensured terminological consistency by implementing this decision in all three segments.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator H	25	98%	Revise	Match-external	Use the position knob to filter out the natural bass change obtained if the subwoofer is placed, for example, in a corner, as compared to a more freestanding position.
Match-external actions:		Concordance search + Local dictionary x 4 + Google search x 6			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Brug positionsomskifteren til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit. BT: Use the position switch to filter out changes in the bass reproduction as a result of the subwoofer e.g. being placed in a corner instead of freely.		N/A
2	Places the cursor before "positionsomskifteren" and writes "base", deletes "e", writes "ka", deletes "a", writes "nappen". Deletes "positionsomskifteren".		Brug basknappen til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.		
3	Writes "nat" between "bortfiltrere" and "ændringer", deletes "t", writes "turlige".		Brug basknappen til at bortfiltrere naturlige ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hiørne i stedet for frit.		

Example 23-NL-A-3:

In her match-external revision of segment 3 in the Newsletter, Translator A used the actions *concordance search* and *online dictionary*. First, the translator selected "announced" in the

source segment and ran a concordance search. In the returning results, “announced” had mostly been translated with the Danish verb “annoncere”, once with “lægge ud”, once with “bekendtgøre” and once with “offentliggøre”. Afterwards, the translator went to an online dictionary (www.ordbogen.com) and looked up “announce”, which provided the translations marked in bold in the screenshot in Figure 24.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator A	3	94%	Revise	Match-external	Bang & Olufsen has announced a new partnership with Spotify, the world’s leading music streaming service.
Match-external actions:		Concordance search + Online dictionary			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Bang & Olufsen har indgået et samarbejde med Spotify, verdens førende udbyder af musikstreaming. BT: Bang & Olufsen has entered into a partnership with Spotify, the world’s leading provider of music streaming.		N/A
2	Selects “announced” in the source segment and runs a concordance search. Selects “indgået” in the target segment. Goes to the online dictionary www.ordbogen.com and looks up “announce”. Deletes “indgået” and writes “offentliggjort”. Writes “nyt”.		Bang & Olufsen har offentliggjort et nyt samarbejde med Spotify, verdens førende udbyder af musikstreaming.		

The screenshot shows the Ordbogen.com website. The search bar contains the word "announce". The results are displayed under the heading "Engelsk-Dansk". The word "announce" is listed as a verb with the following translations:

- meddele** - Hun meddelte dem, at hun skiftede arbejde
- tilkendegive** - Han tilkendegav sin utilfredshed
- bekendtgøre** - De bekendtgjorde, at de skulle giftes
- offentliggøre** - De offentliggjorde deres forlovelse
- præsentere** - Hun præsenterede deltagerne
- annoncere** - Han annoncerede nyheden på direkte tv
- udmelde** - Hun udmeldte klart sin utilfredshed
- deklare** - Han deklarede dramatisk, at han ikke kom tilbage
- avere** - Han averterede med frisk frugt

The word "offentliggøre" is highlighted in bold. The website also shows a sidebar with "Seneste opslag" (Latest posts) and a search bar.

Figure 24. Process example 23-NL-A-3 - Online dictionary

After this, the translator returned to SDL Trados Studio, deleted “indgået” (*entered into*) and wrote “offentliggjort nyt” (*released new*) (step 2). Unfortunately, this segment was not discussed with the translator during the retrospective interview, but it would have been interesting to ask the translator about her reasons for choosing “offentliggøre” (*release*),

and not, for example, “annoncere” (*announce*), which was more frequently used in the results of the concordance search.

The translators were only provided with a *reference text* in the FAQ text. The reference text was provided so that the translators could check the layout of the source text. Translators D and E opened the reference text and scrolled in it before starting to edit the matches, but did not return to it during editing, whereas Translators A, B, C, G and H consulted the reference text four times, one time, two, four and five times, respectively, during the editing phase. Thus, all of the translators made use of the reference text, although it was at different times during the translation process and to varying degrees.

Example 24-FAQ-H-28:

Translator H used the external action *reference text* in her revision of segment 28, a 100% match. This is the instance mentioned in Section 5.2.2.1, where the translator consulted the reference text and presumably noticed that the illustration was not “ovenfor” (*above*) the text, as it said in the match, but below the text (step 2). After consulting the reference text, the translator returned to SDL Trados Studio where she placed the cursor in segment 31 (which is a similar segment) and deleted “ovenfor” (*above*). She then returned to segment 28 and changed “viser” (*show*) into “er vist ved” (*is shown by*) before deleting “ovenfor” (*above*) (step 3). Later in the editing phase, the translator returned to segment 28, where she changed “ved” (*by*) to “med” (*with*) (step 4).

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator H	28	100%	Revise	Match-external	Shown by light grey areas in the illustration.
Match-external actions:		Reference text			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Dette viser de lysegrå områder i illustrationen ovenfor. BT: This show the light grey areas in the illustration above.		N/A
2	Consults the corresponding spot in the reference text.		Dette viser de lysegrå områder i illustrationen ovenfor.		
3	Returns to this segment after having made a change in segment 31. Writes "er vist ved" between "Dette" and "viser". Deletes "viser". Deletes "ovenfor".		Dette er vist ved de lysegrå områder i illustrationen.		
4	Returns to this segment after having entered segment 34. Deletes "v" in "ved" and writes "m".		Dette er vist med de lysegrå områder i illustrationen.		

The actions *pasting element copied from another segment* and *pasting element copied from the source segment* are external actions in which, as the labels imply, an element is copied either from another segment or from the source segment, respectively, and pasted into the target segment. In the FAQ, the *pasting element copied from another segment* action was used by Translators A, B and G (four times in total) and the *pasting element copied from the source segment* action was used by Translators A, B, C, D and H (22 times in total). In the

Newsletter, *pasting element copied from another segment* was used by all translators (11 times in total), whereas *pasting element copied from the source segment* was not used by any of the translators.

In the FAQ text, it was noteworthy that in all *pasting element copied from the source segment* actions, the element was either one or more words that should remain untranslated in the target text or a tag indicating the presence of a visual element. Also worth noting is that the translators with most actions of this type, namely Translators A and H (with 6 and 7 of these actions, respectively), were two of the translators who did not use the *Copy/Cut → Copy Source to Target → Insert* action. This may indicate that the elements that seemed to trigger the use of the *Copy/Cut → Copy Source to Target → Insert* action for Translators C, D, E and G may have triggered the use of the *pasting element copied from the source segment* action for Translators A and H. However, it should be noted that even though Translators A and H's use of this external action always concerned words to remain untranslated in the target text or a visual element, they did not use this action every time they encountered such elements in the source text.

In the Newsletter, 6 of the 11 *pasting element copied from another segment* actions occurred in segment 5. As it appears from Table 36, the source texts in segments 4 and 5 make up one sentence ([4] *Bang & Olufsen's digital music system, BeoSound 5, now ships with complete Spotify integration, adding 20 million songs in premium sound quality to* [5] *BeoSound 5's already versatile repertoire.*) However, for unknown reasons, the sentence had been split into two segments. The 84% match provided in segment 4 also contained a translation of the source text in segment 5 ("det allerede alsidige repertoire for BeoSound 5" (*the already versatile repertoire for BeoSound 5*), marked in bold in Table 36), which Translators B, C, D, E, G and H copied from the match in segment 4 and pasted into segment 5. Interestingly, Translator E returned to segment 5 later in the translation process and changed the translation back to what had been proposed by the MT system ("BeoSound 5's allerede alsidige repertoire" (*BeoSound 5's already versatile repertoire*)). The fact that the sentence had been split into two sentences influences the findings by making the number of *pasting element copied from another segment* actions increase; however, translators may also encounter such issues in their daily work.

Segment number	Match type	Source text	Match
4	84%	Bang & Olufsen's digital music system, BeoSound 5, now ships with complete Spotify integration, adding 20 million songs in premium sound quality to	Bang & Olufsens digitale musiksystem, BeoSound 5, leveres nu med komplet Spotify-integration, og følger dermed 20 millioner sange i førsteklasses lydkvalitet til det allerede alsidige repertoire for BeoSound 5. BT: Bang & Olufsen's digital music system, BeoSound 5, is now delivered with complete Spotify integration and thereby adds 20 million songs in first-class sound quality to the already versatile repertoire for BeoSound 5.
5	MT	BeoSound 5's already versatile repertoire.	BeoSound 5's allerede alsidige repertoire. BT: BeoSound 5's already versatile repertoire.

Table 36. Segments 4 and 5 - Newsletter

In the following, an example of the use of the *pasting element copied from the source segment* action is provided from the FAQ text and an example of the use of the *pasting element copied from another segment* action is given from the Newsletter.

Example 25-FAQ-H-21:

Translator H used the action *pasting element copied from the source segment* in her revision of segment 21. In the match, the Danish verb “se” (*see*) features twice, which is not a correct Danish construction. The translator started by deleting “Se o”, thus deleting the first “se”. Then she wrote a capital “O” as the first letter in “Oplysninger” (*Information*). After this, the translator wrote “findes i” (*is found in*) and deleted “ , se” (*, see*) (step 2), thereby deleting the second “se”. It would have been possible for the translator to retain one of the occurrences of “se”. In the interview, when asked about the match, the translator explained that it could be used, but that she wanted to use the passive voice to vary the language. She added that MT is word-for-word translation, and that, in isolation, it can provide fine and flawless sentences, but that you sometimes need to reformulate a bit to improve the flow of the text.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator H	21	MT	Revise	Match-external	For information about more advanced sound settings, see the Technical Sound Guide .
Match-external actions:		Pasting element copied from the source segment			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		Se oplysninger om mere avancerede lydindstillinger, se Tekniske lyd Vejledning . BT: See information about more advanced sound settings, see Technical sound Guide.		
2	Deletes "Se o" and writes "O". Writes "fubdes" after "lydindstillinger", deletes "ubdes", writes "indes i". Deletes ", se".		Oplysninger om mere avancerede lydindstillinger findes i Tekniske lyd Vejledning .		App. 6, H, ll. 80-98
3	Selects "Technical Sound Guide" in the source segment and copies it. Inserts it after "i" in the target segment.		Oplysninger om mere avancerede lydindstillinger findes i Technical Sound Guide Tekniske lyd Vejledning.		App. 6, H, ll. 74-79
4	Deletes "Tekniske lyd Vejledning.". Inserts a full stop after "Guide".		Oplysninger om mere avancerede lydindstillinger findes i Technical Sound Guide.		

Next, the translator copied “Technical Sound Guide” from the source segment and inserted it into the target segment (step 3). The translator explained in the retrospective interview that the MT engine had translated “the thing in red” (i.e. “Technical Sound Guide”), which should not be translated and that she therefore copied it from the source segment. In the final step, the translator deleted the Danish translation of “Technical Sound Guide”, i.e. “Tekniske lyd Vejledning.” and inserted a full stop after “Guide” (step 4).

Example 26-NL-E-23:

In her match-external revision of segment 23, Translator E used the action *pasting element copied from another segment*. She started out by writing “og projekter” (*and projects*) which

had been left out in the MT match. She then wrote “vandt” (*won*) before deleting “tog af med” (*took off with*) which is an inadequate translation of “took home” (step 2). Afterwards, the translator returned to the preceding segment, segment 22, copied “den eftertragtede red dot award” (*the coveted red dot award*) (cf. example 8-NL-E-22) and inserted it in segment 23. She then inserted a space between “award” and “rød” (*red*) and deleted “rød prik prisen” (*the red dot award*), an inadequate direct translation of “the red dot award” (step 3). In the interview, the translator said that she could use a rather large part of the match, but had to make a few changes in the latter part of the segment. This was in part accomplished by using the *pasting element copied from another segment* action.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Source text segment
Translator E	23	MT	Revise	Match-external	Against more than 4000 competing products and projects from 54 countries, BeoPlay V1 took home the winning prize with the coveted red dot award for product design 2013.
Match-external actions:		Pasting element copied from another segment			
Steps	Process description		Interim target segment		Interview
1	Wording of provided match		I en konkurrence med over 4.000 produkter fra 54 lande BeoPlay V1 tog af med rød prik prisen for bedste produkt design i 2013. BT: In a competition with over 4,000 products from 54 countries BeoPlay V1 took off with red dot award for best product design in 2013.		
2	Writes "og projekter" between "produkter" and "fra". Writes "vandt" between "lande" and "BeoPlay". Deletes "tog af med".		I en konkurrence med over 4.000 produkter og projekter fra 54 lande vandt BeoPlay V1 rød prik prisen for bedste produkt design i 2013.		App. 6, E, II. 553-556
3	Returns to this segment after having entered segment 22 and copied "den eftertragtede red dot award". Inserts "den eftertragtede red dot award" before "rød". Inserts a space between "award" and "rød". Deletes "rød prik prisen".		I en konkurrence med over 4.000 produkter og projekter fra 54 lande vandt BeoPlay V1 den eftertragtede red dot award for bedste produkt design i 2013.		

5.2.3 Synthesis and discussion

In what follows, the results of the analyses that address RQ1 and RQ1a are synthesized and discussed. To answer RQ1, based on a process analysis, all matches in the FAQ text and the Newsletter were categorized as belonging to the *accept*, *reject* or *revise* category. First, quantitative results for this categorization were presented. The analysis showed that, in the **FAQ** text, CM matches (100%) and 100% matches (94%) were mostly accepted which was also to be expected as the source segments are identical to the source segments stored in the TM. 95-99% matches were mostly revised (50%) or accepted (43%). Contrary to expectation, 85-94% matches were mostly rejected (55%). This, however, appeared to be

caused by three specific source text segments in the FAQ text which could be transferred directly to the target text without changes, and this appeared to make all translators use the Copy Source to Target function to reject these matches. 75-84% matches were mostly revised (90%). The same was the case for 70-74% matches (71%), although the remaining 29% of these matches were rejected. 79% of MT matches were revised, 12% were rejected and 9% were accepted. The fact that 9% of the provided MT matches were accepted is interesting from a productivity perspective, since these were instances where the MT engine produced suggestions that were acceptable to the translators without changes. In terms of the TM/MT threshold, the analysis of the FAQ text indicated that it might be preferable to set the threshold higher than 70%, since the translators deemed 29% of 70-74% matches not worth revising compared to 12% of MT matches. However, the 29% include one 70% match which was rejected by 6 of the translators. In any case, this needs to be related to results on, for instance, editing speed and thus needs further exploration. The **Newsletter** contained no CM matches, but the translators mostly accepted the 100% matches (86%). 95-99%, 85-94%, 75-84%, 70-74% and MT matches were all mostly revised (100%, 79%, 94%, 95% and 93%, respectively). Very few matches were rejected in the Newsletter, and 4% of MT matches were accepted without changes. Regarding the TM/MT threshold, there were only small differences between the translators' choices in MT matches and low fuzzy matches. Thus, on the basis of this analysis, this might indicate that these matches are of a comparable quality. However, as mentioned above, this needs to be seen in the light of results for editing speed, for example. If we compare the results of the categorization of matches in the two texts, we see that 100% matches are mostly accepted in both texts and that TM fuzzy matches (with one exception) and MT matches are mostly revised in both texts. However, whereas all TM fuzzy match types and MT matches were sometimes rejected in the FAQ text, only 75-84% and MT matches were rejected in the Newsletter and only on a few occasions.

RQ1a was addressed through an analysis aimed at identifying characteristics of the translators' interaction with the MT-assisted TM tool in the *accept*, *reject* and *revise* categories. Concerning the **accept** category, analysis of the FAQ text showed that the translators were typically able to accept matches without carrying out any observable research to verify the provided matches. The same was the case in the Newsletter. The accepted fuzzy TM matches and MT matches had different characteristics. For instance, some were acceptable condensed translations of the source-text segments, some contained what the translators appear to have deemed insignificant differences compared to the source-text segments, some were acceptable direct transfers of source-text segments and some were accepted although they did not appear to be entirely acceptable translations.

With respect to the **reject** category, it was interesting to note that in both the FAQ text and the Newsletter, no matches were rejected by use of "pure" deletion, i.e. where the translators delete the match letter by letter or use the mouse or the keyboard to select the match and delete it all at once. This goes against what is typically assumed in the CAT literature, namely that when translators reject matches, they translate the source segment from scratch (cf. e.g. Bowker & Fisher 2010, p.61; Kenny 2011, p.467; Garcia 2015, p.81). The present study shows that this is not the case: in the FAQ text, the translators mostly rejected matches using the Copy Source to Target function, i.e. by replacing the match with the

source segment and then using this as the point of departure for their translation. In one case, a translator rejected a TM match by replacing it with an MT match. In the Newsletter, two matches were rejected because the Copy Source to Target function was used, and two because the TM matches were replaced by MT matches. It was also interesting to note that, in the FAQ text, all of the rejected matches had one of the following characteristics: 1) the entire source segment could be transferred directly to the target text segment and used as the translation in an unchanged form, 2) the source segment contained one or more red words, which should remain untranslated in the target text, or 3) the source segment contained a tag indicating the presence of a visual element. In the Newsletter, the source segment for the match, which two translators rejected by use of the Copy Source to Target function, also contained elements that could be transferred directly to the translation. Thus, the study suggests that certain elements such as source-text items which can be directly transferred to the translation, formatting and tags trigger the rejection of matches using the Copy Source to Target function. With respect to MT matches, this finding is also interesting in the context of Moorkens and O'Brien's (2013) study which found that 81% of the participating translators would like to have a shortcut for "one-click rejection of MT suggestion". Using the Copy Source to Target function is, in effect, a one-click rejection of the MT match, but translators might also appreciate the possibility of quickly deleting the match and then translating from scratch.

Concerning the **revise** category, quantitative results on the distribution of the revised matches into match-internal and match-external revision were first presented for both texts. In the FAQ text, for all translators combined, match-internal revision was more frequent than match-external revision in 100% and 95-99% matches. For 85-94% matches, match-internal and match-external revision were almost equally frequent, and for 75-84% matches match-internal revision was most frequent. For both 70-74% and MT matches, match-external revision was most frequent. Thus, in terms of the FAQ text, the study suggests that translators primarily rely on their own judgement when editing TM matches with match values from 75% and up, whereas in 70-74% matches and MT matches they need other support than the proposed matches to produce an acceptable translation of the match in question. For 70-74% matches, match-external support was sought in 93% of cases, whereas it was 62% for MT matches. This is interesting as it supports the point mentioned above, namely that it might be advisable to set the TM/MT threshold higher than 70%. However, this would need to be explored further due to the low amount of data in the 70-74% match type and should be combined with results for other factors such as editing speed. In the Newsletter, in all TM match types, match-internal revision was more frequent than match-external revision, whereas match-external revision was more frequent in MT matches. Thus, in terms of the Newsletter, the study suggests that translators rely on their own judgement in TM matches and that in MT matches, they more frequently make use of resources or functionalities external to the match.

Next, the analysis explored the subcategories *match-internal* and *match-external* revision in order to contribute to identifying characteristics of the translators' interaction with the MT-assisted TM tool. In terms of **match-internal revision**, focus was on the instances where the translators were provided with suggestions from the AutoSuggest function. The analysis

showed that in both the FAQ text and the Newsletter, the suggestions were seldom employed by the translators. This is interesting from a TCI perspective since it leads to speculations as to whether AutoSuggest suggestions are overall more of a hindrance to successful and frictionless interaction with the tool than they are a help. Ehrensberger-Dow and Heeb (2016) also found that the translator participating in their study tended to ignore the AutoSuggest suggestions, also in cases where she ended up typing the same word as the suggestion. The finding seems to be in line with the study by O'Brien et al., who found that when shown the AutoSuggest feature, translators reported that they "thought the feature could be useful, but also expressed the opinion that they would like to have the option of turning it off" (2010, p.3). This finding thus calls into question expectations that auto-completion functions such as AutoSuggest are "probably the most productive [...] way of subsegment matching" (Reinke 2013, p.33). However, possible explanations for the relative lack of usefulness of the AutoSuggest function might also be that the sources from which the function retrieves the suggestions were not sufficiently large to predict successfully what the translators were writing, that translators prefer typing their translations themselves, and/or that they even prefer to ignore the suggestions.

In terms of **match-external revision**, the analysis showed that the translators used a number of different external actions. In both texts, the translators used the actions *concordance search*, *Copy/Cut → Copy Source to Target → Insert*, *termbase search*, *Google search*, *search in online dictionary*, *search in local dictionary* and *pasting element copied from another segment*. In the FAQ text, in addition to the actions already mentioned, the translators used the external actions *Copy Source to Target*, *reference text* and *pasting element copied from the source segment*. In the Newsletter, in addition to *concordance search*, *Copy/Cut → Copy Source to Target → Insert*, *termbase search*, *Google search*, *search in online dictionary*, *search in local dictionary* and *pasting element copied from another segment*, the translators used the external action *Web page*.

Examining all seven translators' use of external actions revealed that, in the FAQ text, in 100% matches, the actions *reference text* and *pasting element copied from another segment* were most frequent. In 95-99% matches, the action *Google search* was most frequently used. In 85-94% matches, the external action *concordance search* was most frequently used, whereas the *Copy/Cut → Copy Source to Target → Insert* action was most frequently used in 75-84% matches. In 70-74% matches, these two actions were used in an equal number of cases. In MT matches, *concordance search* was the external action most frequently used. In the Newsletter, only one external action was used in 100% matches namely *search in a local dictionary*. No external actions were used in 95-99% matches. In the remaining match types (85-94%, 75-84%, 70-74% and MT matches), the action *concordance search* was most frequent. In both texts, a wider range of external actions was used in MT matches than in the other match types. In the following, the use of selected external actions is commented upon.

Analysis of the individual translators' use of external actions showed that, in both the FAQ text and the Newsletter, *concordance search* was the only external action used by all translators, and for most of the translators, it was the action most frequently used. Thus, the

study suggests that *concordance search* is the preferred external action for translators. This result ties in with Karamanis et al. (2010; 2011), for example, who found that the concordance search is the primary resource used by translators when they encounter a translation problem. As noted above, frequent use of the concordance search might be motivated by the translators wanting to check the MT suggestions against the contents in the TM, i.e. against texts translated for the same client. Zapata (2016, p.142) notes a similar kind of behaviour in his study of translators' use of a biconcordancer during post-editing, namely that translators often double-checked solutions proposed by an MT system.

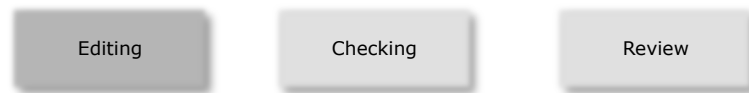
The *Copy/Cut → Copy Source to Target → Insert* action was used by four of the translators in the FAQ text and by one translator in the Newsletter. The analysis showed that this action always occurred in segments where the source text contained either a word that could be transferred directly to the target text (formatted in red) or a tag indicating the presence of a visual element that had not been transferred to the match. Thus, it seems that the *Copy/Cut → Copy Source to Target → Insert* action is an example of what Risku refers to as iterative operation patterns, namely "observable, iterative, regular patterns that stand out as behavioural patterns in the way the translator works" (2014b, p.348), since this action was applied in similar situations and by the same translators, who to a varying extent seemed to apply this action as a cognitive routine and who each either used *copy* or *cut*. This point is further supported by the observation that, in the FAQ text, for the four translators in question, a number of matches either were rejected using the Copy Source to Target function, or the *Copy/Cut → Copy Source to Target → Insert* action was used during match-external revision. The Newsletter did not contain any words formatted in red, nor did it contain formatting or tags. With this in mind, it was interesting to note that the *Copy/Cut → Copy Source to Target → Insert* action was used only once in the Newsletter. This further supports the aforementioned suggestion that certain elements (words which can be transferred directly to the target segment, formatting and tags) trigger this action. Also, in the Newsletter, only two segments were rejected using the Copy Source to Target function, which points in the same direction.

The action *pasting element copied from the source segment* was only used in the FAQ text. It is noteworthy that in all cases, the "element" consisted of one or more words that should remain untranslated in the target text and/or of a tag indicating the presence of a visual element. Moreover, the two translators with most actions of this type (A and H) were two of the translators who did not use the *Copy/Cut → Copy Source to Target → Insert* action, indicating that the *pasting element copied from the source segment* action might be an iterative operation pattern for Translators A and H similar to how the *Copy/Cut → Copy Source to Target → Insert* action seemed to be an iterative operation pattern for Translators C, D, E and G. The *pasting element copied from the source segment* action was not used in the Newsletter.

In both texts, more than half of the translators carried out Google searches. In the FAQ text, none of these searches was followed by a translator visiting a Web page that came up as the result of these searches. This was, however, the case in a few instances in the Newsletter. Thus, the study shows that in most cases, translators find it sufficient to use Google to check

possible Danish translations of English source-text items and check the frequency of certain Danish phrases and that only in a few cases do they go beyond Google and carry out further research. Thus, these searches were considered examples of what Jimenéz-Crespo refers to as using the “Web as Corpus” (2015, p.47). The actions *termbase search*, *search in online dictionary* and *search in local dictionary* were not frequent in any of the texts.

By juxtaposing the process analysis with the translators’ comments in the retrospective interviews, this enhanced the ability of the process examples given throughout the analysis to provide deeper insight into the translators’ interactions with the MT-assisted TM tool. The examples made it possible to follow the unfolding of the translation, and the comments from the retrospective interviews on the translators’ thoughts about their processes and arguments for their solutions helped to clarify these processes. For example, some examples suggested that the translators tried to avoid unnecessary typing, while others illustrated how translators dealt with what they seemed to experience as translation problems by using different match-external resources to reach a terminological decision. Also, a number of examples showed that the arguments presented by translators for their translation choices related to the context in which the target text was intended to be used. The translators also pointed out some undesirable issues regarding MT, for example that words were left out of the MT matches, and the analysis also suggested that integration of the MT engine with the termbase caused problems in places. These and other issues are further addressed in Section 5.8 concerning RQ7. Finally, several of the examples indicated that the translation processes were not linear in the sense that the translators returned to a previous segment during the editing of an exemplified segment or returned to an exemplified segment later in the process. This is explored further in the analysis in Section 5.4.



5.3 Editing speed: Introduction

RQ2 reads:

2. How much time do the translators spend on editing TM and MT matches, respectively?

The investigation of RQ2 sheds light on a further aspect of the translators' interaction with the MT-assisted TM tool, namely the time spent on editing TM and MT matches. In Krings' (2001) terms, as explained in Section 2.2, this is an expression of the temporal effort involved in editing TM and MT matches.

As stated by Sin-wai, "[a]ll computer-aided translation systems aim to increase translation productivity" (2015, p.44), i.e. to increase the speed with which translations are produced. This is also the motivation behind integrating MT into TM systems and it is therefore relevant to compare the speed with which translators edit TM matches to the speed with which they edit MT matches. In particular, as pointed out by Tatsumi (2010, p.145), it is interesting to explore whether there is a TM match threshold under which editing of TM matches takes more time than editing of MT matches. As described in Section 3.4.2.1, previous studies have shown different results in this regard. However, to my knowledge, no study including Danish as one of the languages has previously investigated this aspect.

The investigation of RQ2 draws primarily on the screen recordings and to a lesser extent on the keystroke logging files and the observational protocols. The method used to analyze these data is explained in the following.

5.3.1 Analytical method

The investigation of RQ2 is based on a qualitative analysis of the screen recordings with the purpose of measuring the time translators spent on editing each match. Since it is not appropriate to compare the time spent on editing two segments of a different length, the time is normalized to the length of the segment as argued by Tatsumi (2010, pp.40–41). In the present study, the time spent editing a match is measured in minutes and is normalized to the number of words in the source text segment. The number of words in a source segment is calculated using the method explained in Section 4.3.1.1.3.1.3, footnote 14. Hence, editing speed will be calculated in words per minute, in line with previous studies (Krings 2001; Guerberof Arenas 2009; Tatsumi 2010; Screen 2016). In the following, the analytical method used to measure the time spent by each translator on each segment is described.

5.3.1.1 Time measurement

Segment level time data is difficult to gather in current CAT tools (Aziz et al. 2012; Moran, Lewis, et al. 2014; Moran, Saam, et al. 2014). As was evident in the literature review in Chapter 3, previous studies have tackled this challenge in different ways, for example by instructing translators to process segments as sequentially as possible (Federico et al. 2012), instructing them to use a particular shortcut to close segments (Tatsumi 2010) and developing experimental user interfaces that only display one segment at a time (Guerberof Arenas 2009; Guerberof Arenas 2012; see also Plitt & Masselot 2010). These procedures are obtrusive in the sense that translators are asked to work in a manner that is not business-as-usual (Moran, Saam, et al. 2014, p.100), but they make it possible to calculate automatically the time spent on editing specific, individual segments. In this study, none of these solutions was considered, however, as I wanted to let the translators work as naturally as possible without imposing any specific procedures or unfamiliar interfaces on them for reasons of ecological validity.

As mentioned in Section 4.3.1.1.3.1.4.2.1, Inputlog logged insufficient information when combined with SDL Trados Studio 2011, and it was thus not possible to calculate automatically the time spent on individual segments based on the logging data. Inspired by Tatsumi, drawing on the keystroke logging files, I first tried to utilise the translators' use of keyboard shortcuts to close one segment and open the next to measure the time spent on each segment. However, the translators did not use these shortcuts consistently and did not always process the segments in a linear manner, which made the use of shortcut operations as time indicators insufficient and unreliable.³⁵ Instead, I decided to conduct a qualitative analysis of the screen recordings to identify start and end times for the editing of each segment. To this end, criteria for the interpretation of the screen recordings were developed, in part in an inductive manner and in part inspired by theory. The screen recordings of the seven translators' processes when translating the FAQ text and the Newsletter were analyzed (approx. 7 hours of recordings in total) by applying these criteria. This was a process of data conversion in which qualitative data were quantitized (cf. Sections 4.2 and 4.3.2).

When viewing a screen recording in BB FlashBack Express, the video is automatically divided into very small sub-divisions, called frames. When a frame is selected in the Framebar, the software displays the specific point in time, for example 41:27.67 (41 minutes, 27 seconds and 670 milliseconds divided by 10), see Figure 25. The Framebar also contains so-called key press data that indicate which keys were activated by the translator at specific times. In the example displayed in Figure 25, it is visible from the Framebar that the translator presses Ctrl+Enter at 41:27.67. Indicators of mouse activity (movement and clicks) are also displayed in the Framebar. Thus, the timing of a specific action can be identified by selecting the frame in which the action occurs.

³⁵ Translators sometimes used the keyboard shortcuts Ctrl+Alt+Enter or Ctrl+Enter to close one segment and open the next segment (Ctrl+Alt+Enter) or to close one segment and open the next unconfirmed segment (Ctrl+Enter). At other times, they used the mouse or the keyboard arrows to navigate between segments. None of the translators used any method consistently, and all translators to varying degrees returned to previous segments.

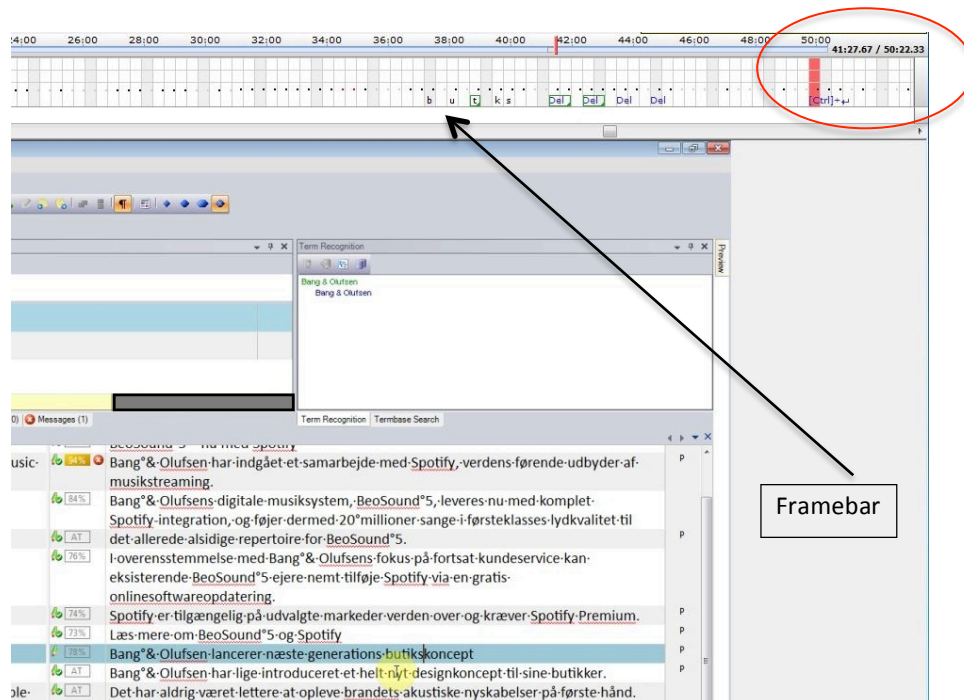


Figure 25. The Framebar in BB FlashBack Express

Start and end times for editing each segment were registered in MS Excel. Each translation process was analyzed multiple times to ensure consistency, and the logging data from Inputlog were used to crosscheck the analysis. If the translator entered a segment more than once, additional times were registered, facilitating the calculation of the total time spent on each segment.³⁶

5.3.1.1.1 Analytic criteria

The basic assumption underlying my interpretation of the actions on the screen was that a translator is cognitively working with a segment when the cursor is placed in the specific segment. This appears to correspond to the overall criteria applied in e.g. O'Brien (2007; 2008), Tatsumi (2010), Teixeira (2011), Vazquez (2012) and Federico et al. (2012). Since during checking, translators were often reading through the segments without placing the cursor in most segments, it was not possible to identify which matches were read and evaluated at which times during checking, if changes were not implemented.³⁷ As mentioned in Section 3.4.2.1, this was also identified as a challenge in Teixeira's study (Teixeira 2011, p.117). Thus, only the time spent on each match during *editing* could be included in this analysis. The criteria for identifying start and end times for editing segments are provided in Figure 26.

³⁶ For some reason, the screen recording file from Translator A's participation in the experiment did not contain these key press data. Therefore, in her case, the keystroke logging file was particularly helpful for crosschecking the observations made on the basis of the screen recording.

³⁷ Had eye-tracking been applied, this might have been possible.

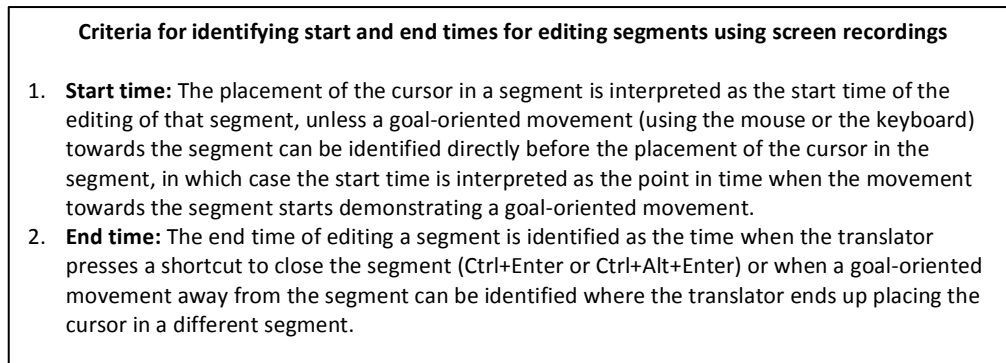


Figure 26. Criteria for identifying start and end times for editing segments using screen recordings

The primary way of identifying start and end times of the editing of each segment consisted in observing in the screen recordings the translators' use of shortcuts to close and open segments. When the shortcuts Ctrl+Alt+Enter or Ctrl+Enter are used, SDL Trados Studio automatically opens the next (unconfirmed) segment, and the point in time when the cursor is placed in the new segment is thus identified as the start time of the work with that specific segment (cf. criterion 1, Figure 26). The end time is identified as the time when the translator uses one of the shortcuts to close the segment (cf. criterion 2, Figure 26).

However, as mentioned above, translators do not consistently use shortcuts to leave and enter segments; they also use the mouse and keyboard arrows. Therefore, inspired by the activity-theory based approach for analyzing screen recording data proposed by Geisler and Slattery (2007), who suggest that human behaviour is always goal-oriented, goal-oriented mouse and keyboard movements were taken to represent the translators' cognitive processing. This is supported by the studies of Chen et al. (2001) and Aoidh et al. (2009), both of which originate in the field of HCI. Chen et al.'s study suggests that there is a strong relationship between gaze position (as measured through eye-tracking) and cursor position, which is interesting since gaze position is normally taken to indicate cognitive processing (according to the *eye-mind hypothesis*, cf. Section 3.3.2). In their study of spatial interaction behaviour in web-based maps, Aoidh et al. use mouse activity as an indicator of the user's interest, thus linking the user's mouse interactions to the thoughts related to a specific piece of information. Aoidh et al. argue that conscious, intentional mouse movements can be identified from a "smooth, steady mouse track", whereas subconscious activities are exemplified by "uneven and sporadic" mouse movements (2009, p.127). They also argue that movements away from an element are "likely to signify a disinterest" (Aoidh et al. 2009, p.121). Mouse movements were also used by Green et al. (2013) as an indication of cognitive processing in their study, where they compared post-editing to human translation. Inspired by these studies, goal-oriented mouse and keyboard movements towards a segment were taken in this investigation to represent the start of the translator's cognitive processing of that segment if the cursor was subsequently placed in the segment (cf. criterion 1, Figure 26), and mouse and keyboard movements away from a segment were taken to represent the end of the translator's cognitive processing of that segment if the cursor was subsequently placed in another segment (cf. criterion 2, Figure 26).

In accordance with the overall assumption that when the cursor is placed in a specific segment, the translator is cognitively working on that segment, time spent on match-external actions (such as concordance searches, Google searches and searches in dictionaries) was included in the time spent on the segment in which the cursor was placed when such an action was initiated, since that segment is expected to be the one that gives rise to the use of the match-external action. As mentioned in Section 3.4.2.1, Teixeira (2011) did not count the time when the translators, for example, switched to another window to look up terminology or went to a web browser, which I have discussed and criticized. However, Teixeira did count the time spent on concordance searches.

In a few cases, I observed that translators ran searches (e.g. concordance searches) on a word, which only occurred in one specific segment in the text, but which was not, however, the segment in which the cursor was placed. In these cases, the time spent on the search was attributed to the segment in which the word occurred. Also, in those cases where the external action *pasting element copied from another segment* was used, the time spent on copying the element from the other segment was attributed to the segment in which the element was subsequently pasted, since the purpose of copying the element was interpreted to be to complete the editing of that segment. Finally, Translators A and C carried out a number of searches using the Find and Replace function, and in these cases the time spent carrying out the searches was not attributed to any segment since it was difficult to interpret what segment gave rise to the searches.³⁸ However, if the translator, as a result of such a search, placed the cursor in a segment and implemented changes, the time spent making these changes was attributed to that segment.

5.3.1.1.2 Exclusion of segments from the analysis

A number of segments were excluded from the analysis of editing speed, as different factors made it impossible to determine how much time was spent editing these segments. For example, in line with the experience of Vazquez (2012, p.230), many different behavioural patterns were identified in the beginning of the processes where some translators began opening the reference file for the FAQ text and then the Studio file (the cursor automatically being placed in segment 1), whereas other translators opened the Studio file and then the reference file while in segment 1, but before they actually started editing the segment. This made it difficult to determine how much time was spent on segment 1 and I therefore decided to exclude segment 1 from the analysis of both texts.

Along the same lines, the last three segments (segments 74-76) in the FAQ text were excluded from the analysis since, as it happened, all three segments belonged to the 100% or CM match categories. This meant that some translators did not enter any of the segments (Translators B, G and H) and other translators entered only one or two of the segments (Translators C, D and E), whereas Translator A entered all three segments. After excluding segment 75 in the FAQ text, a CM match, only one CM segment was left (segment 49). This

³⁸ For the same reason, the use of the Find and Replace function was not categorized as a separate match-external action in the process analysis.

segment only contained one word, and because of the very low amount of data, I decided to omit the CM match category from the analysis of editing speed. The Newsletter contained no CM matches.

A number of other segments were also excluded from the analysis because the observational protocol suggested that the translators were disturbed when working with these segments. As explained in Section 4.3.1.1.3.1.4.2.3, I noted in the observational protocol if anyone talked to the translators during the experiment, if the translators themselves said anything to a colleague or to me, if they talked on the phone etc. The time and the content of the conversations were noted briefly. As stated by Dam-Jensen and Heine, activities “which are not directly related to the object of study (...) have to be filtered out” (2009, p.7). Therefore, in order to achieve the most accurate picture possible with the applied methods, I omitted such segments from the analysis of editing speed.

Disturbances were considered only as instances where the translator was involved in a conversation not related to the experiment. Instances where the translator asked me or, in one case, a colleague, a question related to the experiment, were, on the other hand, not defined as disturbances, as it was assumed that in a normal translation task, the translator would have a similar need to ask someone about the task. The disturbances, among other things, included instances where the translator answered a phone call or answered a question from a colleague which was not related to the experiment. Such instances were identified from the observational protocols and it was thus possible to identify at which times during the process each translator had been disturbed, if at all. Segments affected by disturbances were excluded from the analysis. This resulted in the exclusion of 5 segments from the FAQ text (three from Translator B’s, one from Translator E’s and one from Translator H’s process) and 12 segments from the Newsletter (seven from Translator B’s and five from Translator H’s process), equalling 238 words in total. One could argue that the disturbances reflect translators’ normal work and that segments influenced by the disturbances should therefore not be excluded from the analysis, but since the data are, in the present case, used for quantitative analysis where the editing speeds in TM and MT matches are compared, this was found necessary, as, for example, one very long disturbance would influence the average speed for a whole match type.

5.3.1.1.3 Words included in analysis

Following on from the above, the total number of words and their distribution across match types included in the analysis of editing speed are presented in Table 37.

Match type	FAQ text				Newsletter			
	Total no. of words	Excluded	Included	In % of total word count	Total no. of words	Excluded	Included	In % of total word count
100%	896	175	721	18.2	56	0	56	2.4
95-99%	322	0	322	8.1	224	0	224	9.8
85-94%	210	7	203	5.1	301	0	301	13.1
75-84%	301	0	301	7.6	511	32	479	20.9
70-74%	175	0	175	4.4	182	29	153	6.7
TM matches in total	1904	182	1722	43.4	1274	61	1213	52.8
MT matches in total	2303	57	2246	56.6	1302	218	1084	47.2
In total	4207	239	3968	100	2576	279	2297	100

Table 37. Number of words included in analysis of editing speed

As is evident in Table 37, a total of 3968 and 2297 words were included in the analysis of editing speed in the FAQ text and the Newsletter, respectively. Thus, the amount of data is considerably smaller in the Newsletter than in the FAQ text. In terms of the distribution of words across match categories, in the FAQ text, 1722 words in TM matches (43.4%) and 2246 words in MT matches (56.6%) were included in the analysis. In the Newsletter, 1213 words were in TM matches (52.8%) and 1084 were in MT matches (47.2%). It should be noted that the number of words in each of the individual TM match categories (constituting between 2.4% and 20.9% of the total number of words) is considerably smaller than the number of words in the MT match category (constituting 56.6% and 47.2% of the total number of words in the FAQ text and the Newsletter, respectively). This obviously has an impact on the reliability of the results presented in the following.

5.3.1.2 Limitations

Admittedly and obviously, the method has its limitations. Firstly, we cannot know for sure that the time a translator spends in a segment is entirely used for thinking about that particular segment. Actually, following Séguinot, we must expect it not to be, since “it is perfectly natural for people to let their minds wander, to drift in and out. Human beings rarely attend one hundred percent to the task at hand” (2000, p.145). However, this is difficult (if not impossible) to account for, and is a limitation inherent in studies seeking to measure time spent on editing specific matches. Secondly, as pointed out by Teixeira, who discussed Green et al.’s (2013) study referred to above, the relationship between mouse movements and cognitive processing identified in other fields might not apply to translation “since translators typically read in a more discontinuous way (cf. Jakobsen and Jensen 2008) and have to type much more than when just web browsing” (Teixeira 2014b, p.30). Thirdly, although it was deemed to be the only viable solution, only including time spent in the editing phase might have unwanted consequences. For example, as mentioned in Section 3.4.3, in the context of MT, Moran et al. point out that by not including the time translators spend on checking their own work, there is a risk of overstating the utility of MT (Moran, Lewis, et al. 2014). This is a relevant risk to keep in mind, particularly if translators work differently with TM and MT matches, respectively, in the checking phase, as pointed out by Teixeira (2013, p.309). Also, as mentioned by Mossop (2007b, p.19), individual translators might have different habits in terms of the amount of self-revision they do during editing

and checking, respectively. He states that some translators do almost all their self-revision in what I have termed the checking phase, whereas others are very thorough during editing and make few, if any, further changes during checking. Such potential differences would influence the results presented in the following and is a point that will be discussed in Section 5.5, where the translators' checking phases are examined. Finally, a limitation is related to the time spent on 100% and CM matches. As explained in Section 4.3.1.1.3.1.2, these matches were automatically marked as *confirmed* translations in SDL Trados Studio. This meant that if the translators used the Ctrl+Enter shortcut after editing a segment, the system would skip such segments and place the cursor in the next unconfirmed segment. The use of the shortcut to skip these segments might be interpreted as an "*a priori* trust attribution" (Teixeira 2014b, p.149) in the sense that translators trust these segments to be acceptable without spending time reading them. However, if translators use the shortcut to skip such segments, but actually spend time reading and evaluating them while the cursor is placed in another segment (e.g. the segment right before or right after a 100% match), this will have an impact on the findings such that the editing speeds for 100% matches will seem higher than they actually were, and the editing speeds of the surrounding segments will seem lower than they actually were. The Newsletter only included one 100% match and this issue was thus not as relevant there as in the FAQ text, in which more than one third of the matches were 100% matches.

To sum up, the priority given to ecological validity comes at the price of these limitations and thus, the interpretation of the results that follows should also be seen in this light. Further, the analytical method should be seen as an attempt to develop a framework for analyzing screen recordings for the purpose of measuring time spent on individual segments, a framework that could be further developed in future studies.

5.3.2 Results

In the following, the results for editing speed are presented for both the FAQ text and the Newsletter. First, in Section 5.3.2.1, the total time spent on the editing phase by each translator is presented. Then, in Section 5.3.2.2, the editing speeds for the different match types in both texts are provided for both the individual translators and for the translators combined. Here, editing speeds in the different match types, the TM/MT threshold and individual differences between the translators are discussed. In Section 5.3.3, the results are synthesized and discussed.

5.3.2.1 Total time spent on the editing phase

The total time spent on the editing phase by each translator in each translation task is shown in Table 38.³⁹

³⁹ Due to the challenges mentioned in Section 5.3.1.1.2 with regard to establishing comparable starting points of the editing phase across the translators and, for the FAQ text, also establishing a comparable ending point of the editing phase, in both texts it was decided to measure the total time spent on the editing phase from the point when the translators started editing segment 2 until they saved the translation file after having reached the end of it or, if they did not save the file at this

Translator	FAQ	Newsletter
A	35.0	22.5
B	25.9	18.0
C	29.0	19.7
D	25.7	17.3
E	34.1	21.5
F	N/A	N/A
G	20.5	15.2
H	41.0	23.4
Mean	30.2	19.7
Median	29.0	19.7

Table 38. Total time spent on the editing phase - FAQ text and Newsletter

On average, the translators spent 30.2 minutes on editing the FAQ text and 19.7 minutes on editing the Newsletter. Individual editing times varied from 20.5 to 41 minutes for the FAQ text (with a median of 29 minutes) and from 15.2 to 22.5 minutes for the Newsletter (with a median of 19.7). In terms of the time spent on the FAQ text, it was quite surprising that the fastest translator, Translator G, was twice as fast as the slowest translator, Translator H. In terms of the Newsletter, Translator G was again the fastest translator and Translator H the slowest, although the difference was less pronounced. The total time spent by each translator on editing in the two texts is also visible from Figures 27 and 28. Interestingly, we see the same pattern in both charts with regard to how much time the translators spent on editing relatively to the others. That is, in both texts, if we look at the height of the bars, they follow this order, ranging from the lowest to the highest: G – D – B – C – E – A – H. In other words, not only was Translator G the fastest translator in both texts and Translator H the slowest; Translator D was also the second fastest in both texts, Translator B the third fastest and so forth. This might suggest that the translators have an individual working style with regard to the time they spend on the editing phase, however, this would require further exploration. Also, it should be borne in mind that the potential time spent on checking is not taking into account here.

point, the point before they went to the top of the translation file to perform checking. I recognize that this deviates slightly from the definition I established of the editing phase in Section 4.3.2, however, I considered it to be the most appropriate solution with the available data.

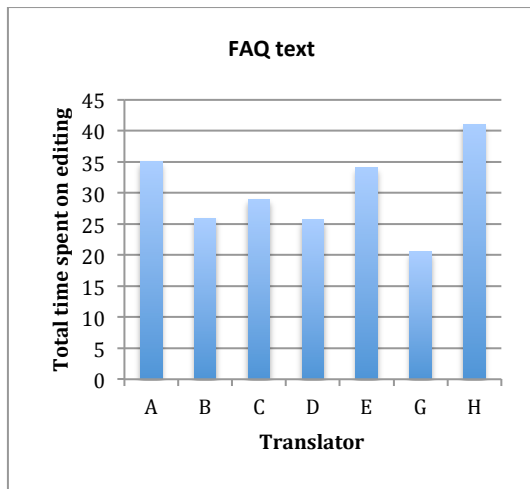


Figure 27. Total time spent on the editing phase - FAQ text

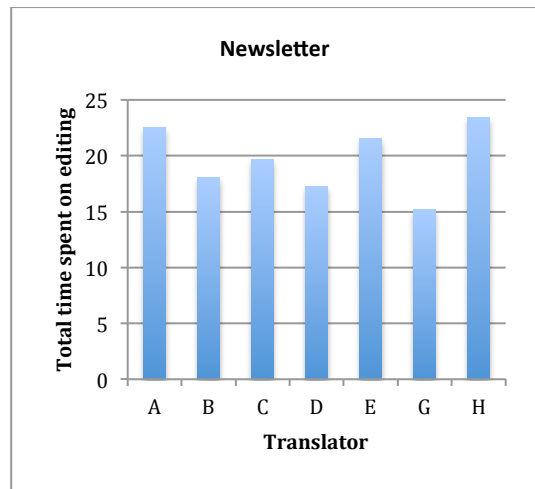


Figure 28. Total time spent on the editing phase - Newsletter

5.3.2.2 Editing speed in the different match types

Tables 39 and 40 show the average editing speeds for each match category for the individual translators as well as average and median editing speeds for the translators combined in the FAQ text and the Newsletter, respectively.

FAQ	A	B	C	D	E	G	H	Average	Median	Standard deviation
100%	69	27130	46	99	13867	266	41	5874.3	97.9	10560.3
95-99%	39	72	25	26	23	41	10	33.7	25.7	19.9
85-94%	21	29	12	14	12	18	15	17.1	15.1	6.2
75-84%	31	45	24	37	28	32	21	31.3	31.2	8.1
70-74%	12	14	19	21	16	21	13	16.4	15.6	3.7
MT	13	17	18	19	14	23	12	16.6	17.3	4.0

Table 39. Editing speed (in words per minute) - FAQ text

Newsletter	A	B	C	D	E	G	H	Average	Median	Standard deviation
100%	82	0	0	33	0	0	15	N/A	N/A	N/A
95-99%	123	123	52	78	91	103	89	94.1	90.6	25.2
85-94%	29	61	28	25	21	55	27	35.2	27.9	16.2
75-84%	27	48	35	27	17	24	23	28.6	26.8	10.1
70-74%	19	27	19	28	24	15	32	23.3	23.7	5.8
MT	11	13	13	15	14	19	10	13.7	13.0	2.9

Table 40. Editing speed (in words per minute) - Newsletter

In the **FAQ** text, the average editing speed for 100% matches is surprisingly high, namely 5874.3 words per minute. The reason for this very high editing speed is that Translators B and E only spent time on one 100% match and spent less than a second there, whereas the other translators spent more time editing 100% matches. This is also reflected in the high

standard deviation in this match category and in the median which is much lower than the average editing speed. In 95-99%, 85-94% and 75-84% matches, the average editing speeds were 33.7, 17.1 and 31.3 word per minutes, respectively. Thus, the results show that translators edited 75-84% matches faster than 85-94% matches, i.e. matches with a higher match value, and almost as fast as 95-99% matches. When median values are considered, translators edited 75-84% matches faster than both 95-99% and 85-94% matches. This is commented on further below. The average editing speeds for 70-74% and MT matches were similar (16.4 and 16.6, respectively), with a slightly higher editing speed for MT matches. Thus, the study shows that editing 70-74% and MT matches takes approximately the same amount of time. When considering the individual translators' editing speeds, it is evident that some translators (A, B and G) edit MT matches slightly faster than they edit TM matches from the 70-74% match category, and other translators (C, D, E and H) edit 70-74% matches slightly faster than they edit MT matches. Apart from the editing speeds for Translators C, D, E and G for the 85-94% TM category and the editing speed for Translator H for the 95-99% TM category, all translators edit TM matches with match values of 75% and above faster than they edit MT matches. In terms of the TM/MT threshold, these results indicate that it might be preferable to set the TM/MT threshold at 75%, since the average speed for MT matches is slightly higher than for 70-74% TM matches and since most translators edit TM matches with match values of 75% and above faster than MT matches. This seems to be in line with a number of the findings from the process analysis addressing RQ1 and RQ1a (Section 5.2) which showed that in the FAQ text, on average and measured in per cent, the translators rejected more 70-74% matches than MT matches and needed match-external support more frequently in 70-74% matches than in MT matches. However, as mentioned in the process analysis, the amount of data in the 70-74% match category is considerably smaller than the amount of data in the MT match category and thus this aspect needs to be explored further.

In the **Newsletter**, four of the translators (B, C, E and G) did not spend any time on the one 100% match included in the text. Their editing speeds in 100% matches were therefore zero and thus, no average, median or standard deviation was calculated (since the values would be divided by zero). The average of the editing speeds of the three translators who did spend time in the segment (A, D and H) is 43.3 words per minute. However, the amount of data is very low here. The average editing speeds for 95-99%, 85-94% and 75-84% matches were 94.1, 35.2 and 28.6 words per minute, respectively. Thus, the translators edited 95-99% matches considerably faster than they edited 85-94% and 75-84% matches. The average editing speeds for 70-74% and MT matches were 23.3 and 13.7 words per minute, respectively. Thus, in the Newsletter, on average, the translators spent more time editing MT matches than any TM match type. This also held true on the individual level, where, except for Translator G who edited MT matches faster than he edited 70-74% matches, all translators edited all TM match types faster than MT matches. Contrary to the FAQ text, no indications are therefore found in the Newsletter that the TM/MT threshold should be higher than 70%. This seems to be in line with the findings of the process analysis in Section 5.2, where we saw that there were only small differences in the translators' choices to accept, reject and revise 70-74% and MT matches and that translators needed match-external support more often in MT matches than in any of the 70-74%, 75-84%, 85-94% and

95-99% match categories. However, again we must note that the amount of data in the TM match categories is much smaller than in the MT match category. When we consider the individual translators we see that except for Translator G, who edited MT matches slightly faster than he edited TM matches from the 70-74% match category, all translators spent more time editing MT matches than editing TM matches from any match category.

Overall, one would expect a reduction in editing speed as the TM value decreases, because, all else being equal, we would expect translators to spend less time editing TM matches with very high match values than TM matches with lower match values. Thus, in the charts in Figures 29 and 30 for the FAQ text and the Newsletter, respectively, we would expect the editing speed to be highest for 100% and then drop gradually towards the 70-74% TM category. For visualization reasons, Figures 29 and 30 are based on the median editing speeds in Tables 39 and 40 (since if they were based on average values, with the very high editing speed for 100% matches, the values for the other match types would be barely visible).

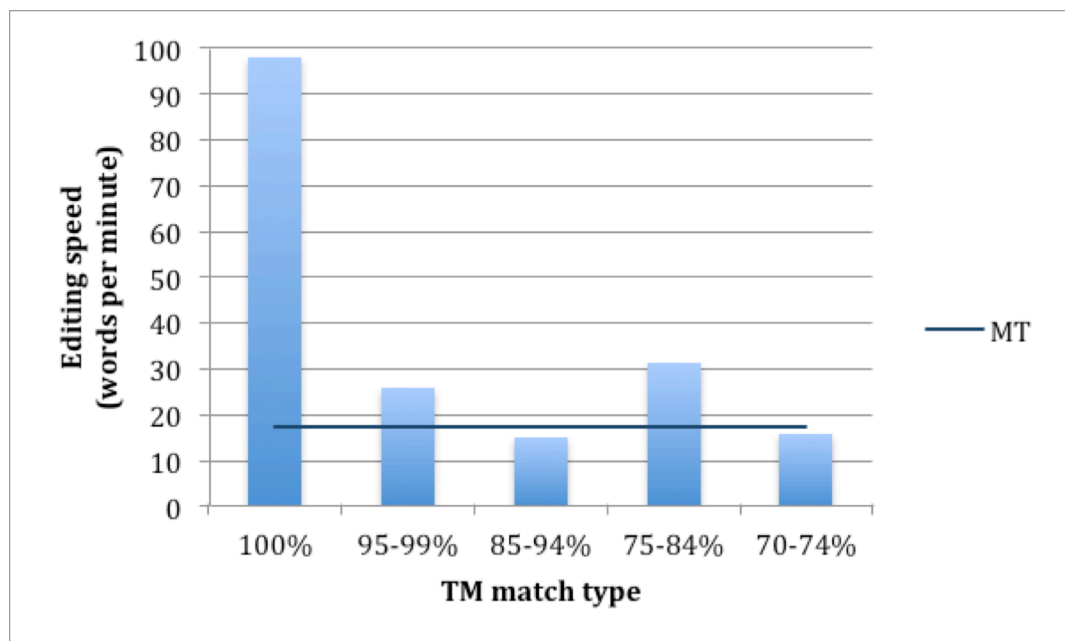


Figure 29. Median editing speeds for the different match types - FAQ text

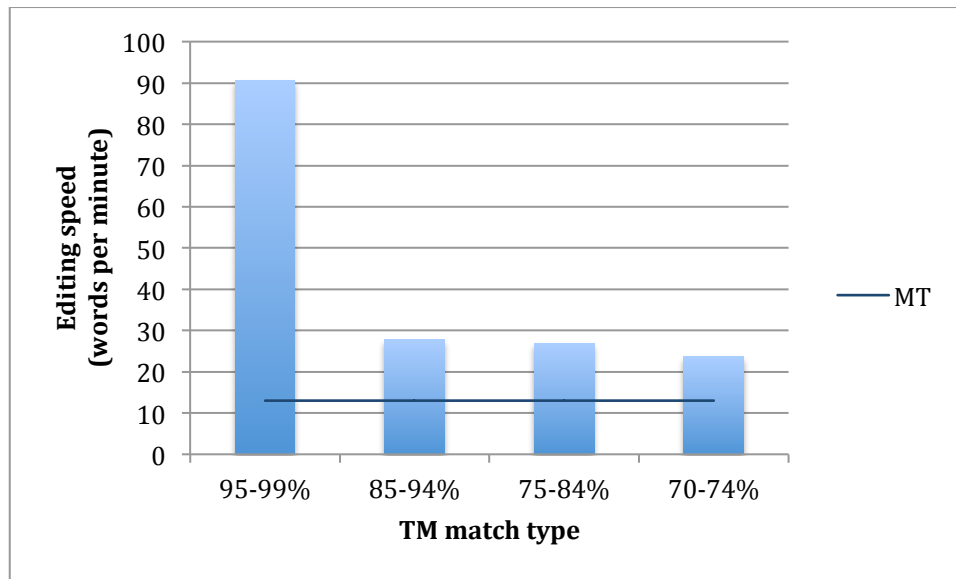


Figure 30. Median editing speeds for the different match types - Newsletter

As shown in Figure 29, for the FAQ text, this is not the case, since the translators edited 75-84% matches faster than both 95-99% and 85-94% matches. Also, the translators edited 70-74% slightly faster than 85-94% matches. As shown in Figure 30, for the Newsletter, where a median value for 100% matches was not included for the reasons explained above, the editing speeds decreased with the match values from the 95-99% category downward. The fact that the editing speed did not decrease with the TM match value in the FAQ text might have different explanations. For example, it might be a consequence of the limited amount of data in the different TM match categories in the experiment. Also, it might suggest that there is not a linear relationship between fuzzy match values and the time taken to edit them, i.e. that translators do not necessarily spend less time editing TM matches with high match values than low match values. This might be the case if translation problems rather than match value determine the editing speed, i.e. if translators encountered more time-consuming translation problems in matches with higher match values than in matches with lower ones. For example, in the FAQ text, the three segments from the 75-84% category all included terms which the translators had already been confronted with in the text (“bass position knob”, “position knob” and “Technical Sound Guide”). This might have contributed to the high editing speed in this match category, since the translators might have been able to type quickly the translation of the terms. Finally, another explanation might be related to the use of the shortcut Ctrl+Enter mentioned above (Section 5.3.1.2), if translators spent time evaluating 100% matches while the cursor was placed in other segments.

5.3.3 Synthesis and discussion

The analysis addressing RQ2 was based on observational measurement of the time translators spent editing each match. The analysis showed that in the FAQ text, based on the average editing speeds for all translators combined, the translators spent less time editing 100%, 95-99%, 85-94% and 75-84% matches than they did editing MT matches. With a few exceptions, this also held true for individual translators. For all translators combined, the average editing speeds for 70-74% and MT matches were similar, with a slightly higher

speed for MT matches. On the individual level, three translators edited MT matches slightly faster than they edited 70-74% matches, and four edited 70-74% matches slightly faster than MT matches. In terms of the Newsletter, the analysis showed that, based on the average editing speeds for all translators combined, the translators spent more time editing MT matches than any TM match type. This also held true at the individual level, where, except for Translator G who edited MT matches faster than he edited 70-74% matches, all translators edited all TM match types faster than MT matches. In the FAQ text, the results indicated that it might be preferable to set the TM/MT threshold at 75%, whereas in the Newsletter, no indications were found that the TM threshold should be higher than 70%. The analysis also showed that, in the FAQ text, average editing speeds did not increase as the match value decreased, as one would have expected, whereas this was the case in the Newsletter. Possible explanations for this were presented and discussed.

As reviewed in Section 3.4.2.1, a number of other studies have investigated editing speed. For instance, Tatsumi (2010) found that the average speed for MT matches was at least faster than the average speed for 75-79% matches. O'Brien (2007) found that the cognitive load (based on editing speed and percentage change in pupil dilation) of MT matches was close to 80-90% TM matches, and Guerberof Arenas (2009) found that the speed for MT matches was higher than for 80-90% matches. In her 2012 study, Guerberof Arenas (2012) found that the editing speed for MT matches was not statistically different from the editing speed for 85-94% TM matches. Thus, compared to the current study and seen in relation to TM matches, MT matches were edited faster in these studies. The fact that the editing speed for MT matches was not as high when compared to editing speeds in TM matches in the current study might have different explanations. For example, it might be related to the language pair, lower quality of the raw MT output and the translators' limited experience with MT. Another potential explanation has to do with the translators' possibilities of performing self-revision by revisiting segments. In both Guerberof Arenas (2009) and Guerberof Arenas (2012), the translators could not return to previous segments. This was, however, possible in Tatsumi's (2010) study, although she instructed the translators to avoid revisits to segments as much as possible. In O'Brien (2007), it is unclear whether translators could return to previous segments. In the current study, this was allowed and translators were not limited in any way in this regard. Obviously, this only makes a difference in terms of the comparison of editing speeds for TM and MT matches if translators do, in fact, work differently with TM and MT matches in terms of revisiting segments, i.e. if they spend more time revisiting and checking MT than TM matches. Another potential explanation for the lower editing speed for MT matches compared to TM matches in this study is that the translators were not instructed to limit the extent of their editing of MT matches. Instead, due to reasons of ecological validity, they were told to translate as they normally would translate these types of texts (cf. Section 4.3.1.1.3.1.4.1.2). However, in Guerberof Arenas (2012) and Tatsumi (2010), for instance, translators were instructed to edit MT matches "with as few edits as possible" (Guerberof Arenas 2012, p.60) and "avoid editing for stylistic sophistication" (Tatsumi 2010, p.231), which might have made the translators spend less time on MT matches in these studies.

Editing

Checking

Review

5.4 Linear or non-linear editing: Introduction

RQ3 reads:

Do the translators edit the matches in a linear or non-linear manner?

RQ3 explores another aspect of the translators' interaction with the MT-assisted TM tool, namely the question of whether the translators edit the segments one by one in a linear manner or whether they revisit previous segments during the process, i.e. whether instances of non-linearity can be identified.

As described in Section 2.3, an aspect of CAT tools that is often problematized is the segment-by-segment approach, which is criticized for forcing translators to work with isolated sentences in a manner which makes them lose track of the text as a whole (Candel-Mora & Polo 2013, p.81). This may have a detrimental effect on the quality of the target text because translators are "removed from a holistic view of the text" (Garcia 2008, p.58) and because it may turn translation into a word- or sentence-replacement activity making the "whole-text, contextual approach (...) a thing of the past" (LeBlanc 2013, p.9). Bowker even expresses concern that "the notion of a "text" has been lost because the tools operate mainly at sentence level" (2002, pp.117–118) and Garcia argues that when working with TM, "[t]ranslators are perceived less as skilled artisans dealing with the holistic properties of the text, than as assembly line workers who attend to the controlled language-like traits of the segment" (2008, p.51). The notion that in CAT, translators work through the segments one by one, i.e. in a linear manner, is reinforced in research designs that do not allow translators to return to previous segments or in which translators are asked to work as linearly as possible. In the following, I therefore investigate whether the translators in the current study processed the matches in a linear or non-linear manner.

Investigating RQ3 draws primarily on the screen recordings and to a lesser extent on the keystroke logging files. In the following, the method used to study linearity is explained.

5.4.1 Analytical method

The analysis investigating RQ3 builds on the analysis of editing speed in Section 5.3 in which the segments the translators were working with in relation to time during the translation process were registered. Using this, it was therefore possible to identify at which points during the processes translators revisited previous segments, if at any, and thus whether the

processes were linear or not. Based on this, graphs illustrating the (non-)linearity of each translator's process in both the FAQ text and the Newsletter could be devised.⁴⁰

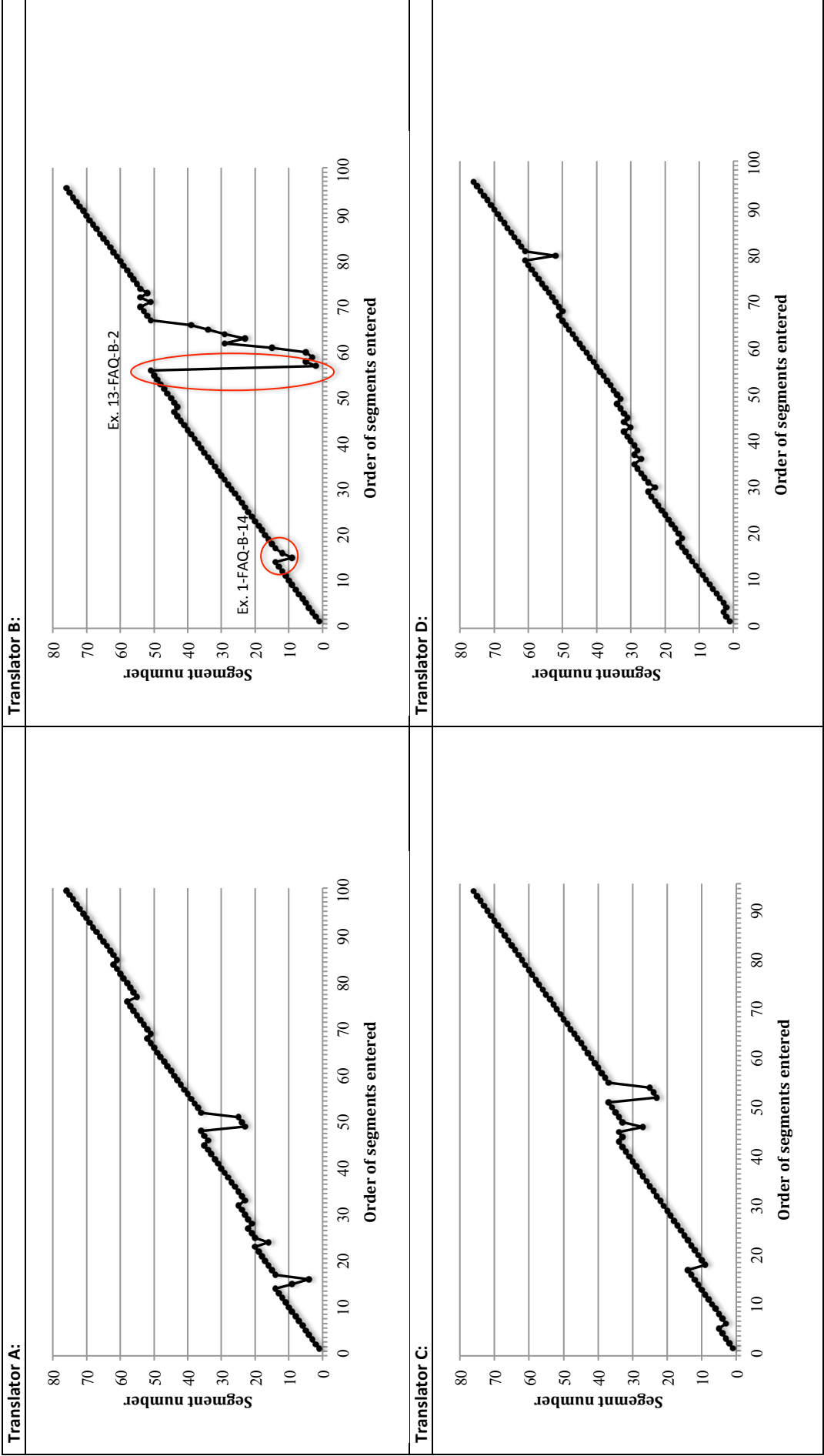
5.4.1.1 Limitations

Since this analysis builds on the analysis of editing speed, it concerns exclusively revisits during editing and has the same limitations as described in Section 5.3.1.2. For instance, we cannot be entirely sure that the translator is thinking about the segment in which the cursor is placed and not about another segment or even something not related to the translation task. Another limitation specific to this analysis relates to the use of the shortcut Ctrl+Enter, also mentioned in Section 5.3.1.2. When the translators used this shortcut, it was not possible to determine when the translators spent time reading and evaluating the skipped 100% and CM matches, if at all. However, in the analysis of non-linearity, when the shortcut Ctrl+Enter was used, the 100% and/or CM matches, which were skipped in this process, have been included in this analysis. Thus, 100% and CM matches, even though they were skipped, were assumed to have been processed by the translators between the segment in which the shortcut was used and the next unconfirmed segment. This may not entirely reflect the translators' cognitive processes; however, this is as close as we can get with the chosen methods.

5.4.2 Results

Figures 31 and 32 show each translator's process when translating the FAQ text and the Newsletter, respectively. The y-axis represents the segments contained in each text, i.e. 76 segments in the FAQ text and 25 in the Newsletter. The x-axis represents the order in which the segments were entered and thus the total number of visits to segments during the process. If a translator edited the segments in a linear manner from the first segment to the last, i.e. without revisiting any segment, the graph would show a diagonal line from the bottom left corner to the top right corner.

⁴⁰ It should be noted that what is investigated here are potential instances of non-linearity at the segment level in the form of revisits to previous segments, and not, as for example investigated by Screen (2016), non-linear processes below the segment level such as the deletion and moving around of elements inside a particular segment.



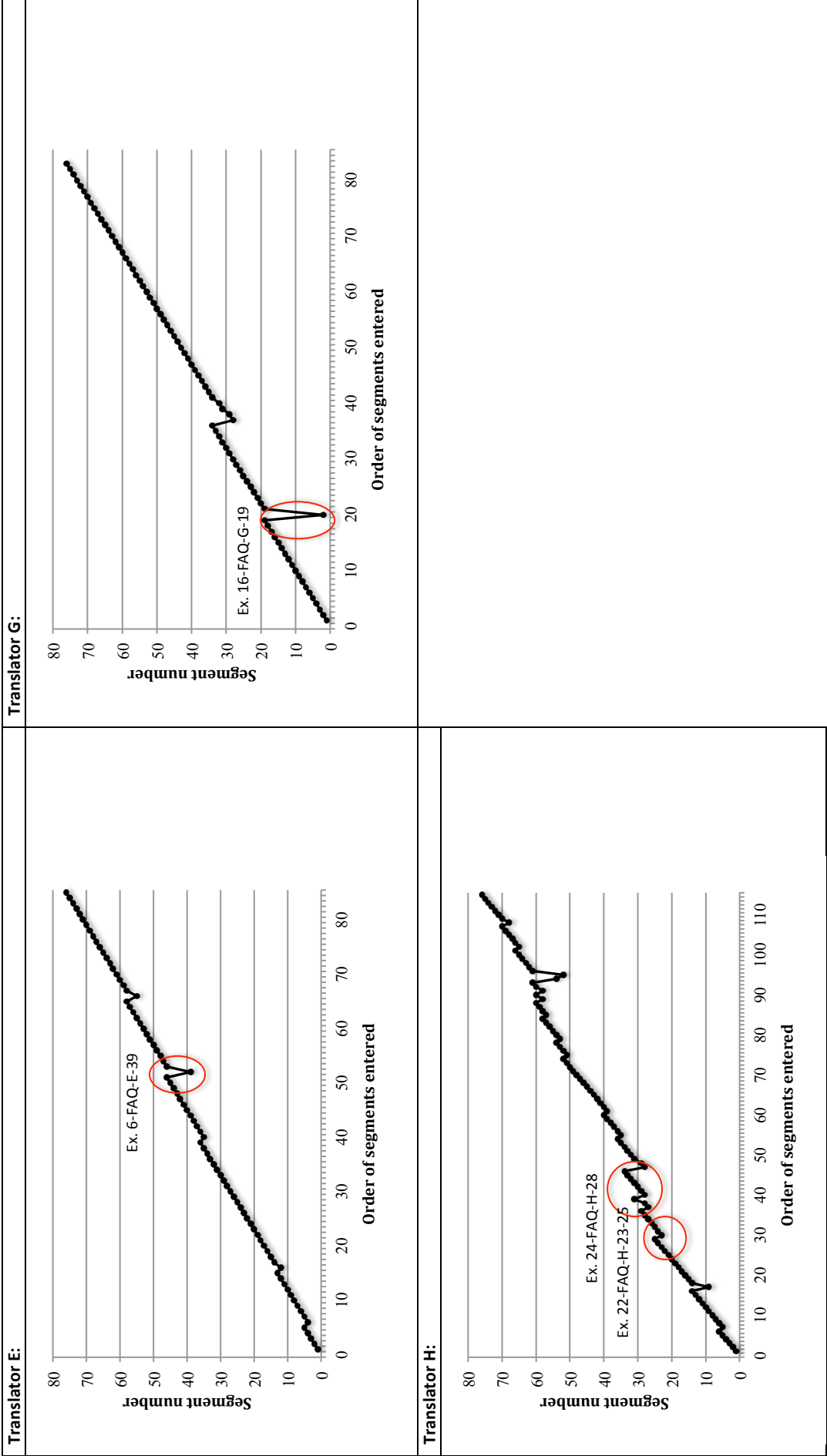
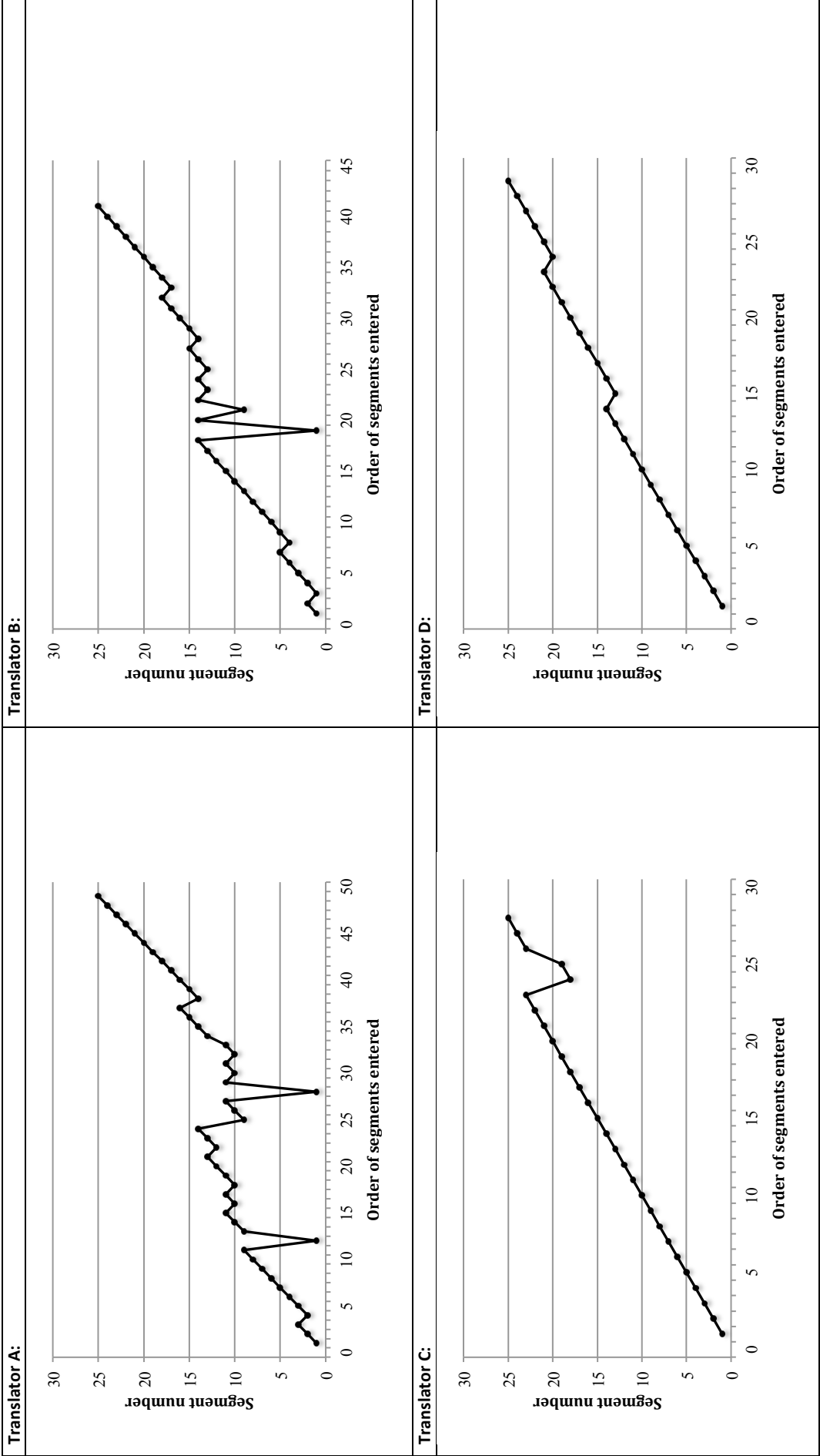


Figure 31. (Non)-linearity - FAQ text



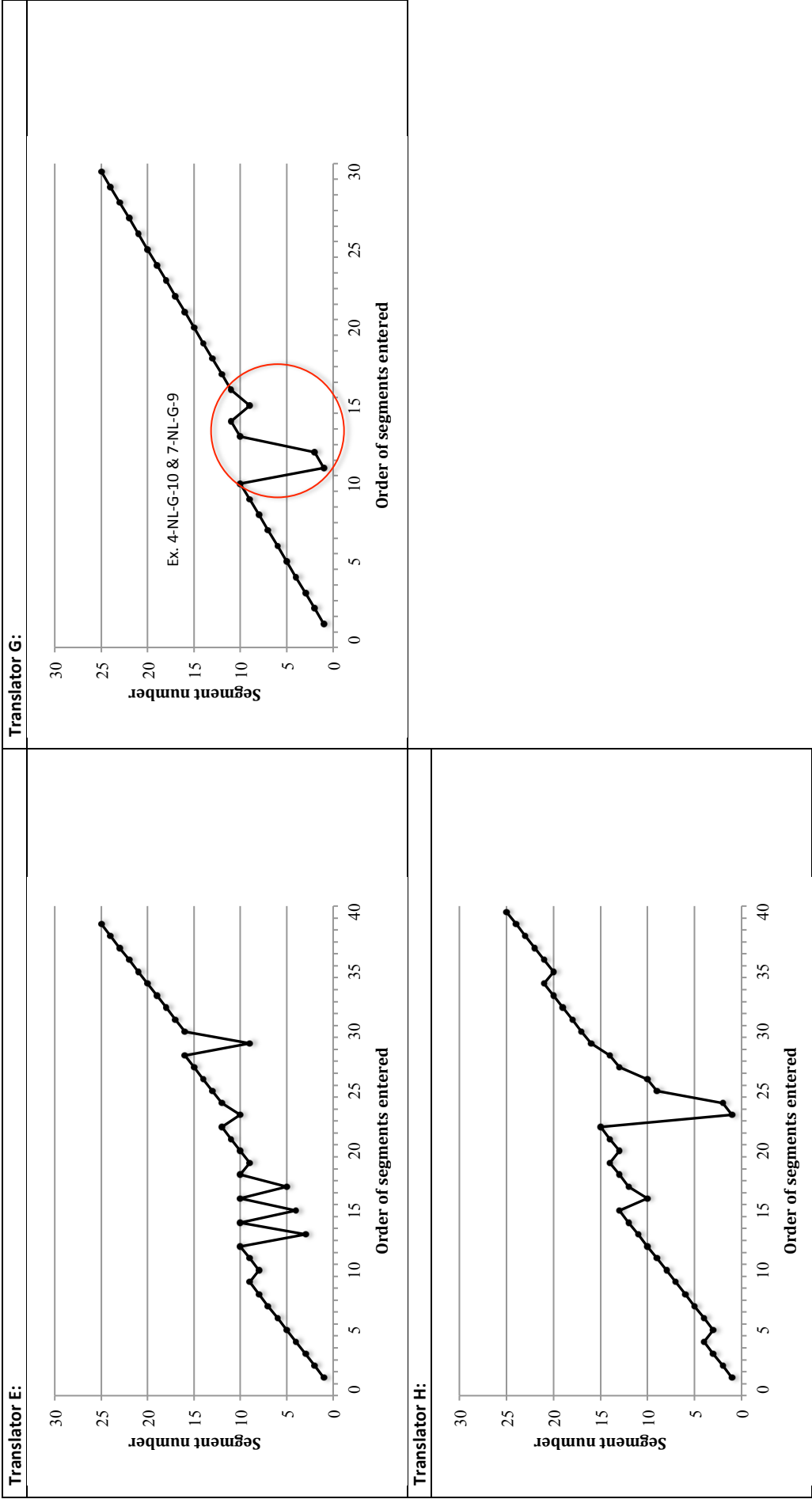


Figure 32. (Non)-linearity - Newsletter

As is shown in Figures 31 and 32, none of the translators' processes when translating the FAQ text and the Newsletter was entirely linear. Thus, all translators revisited previous segments, and all translators had more than one revisit to a previous segment. In other words, all translators to some extent broke with the segment-by-segment approach encouraged by the CAT tool.

Revisits which were mentioned in the process examples given in Section 5.2 are marked in the graphs and commented on briefly below. In the process examples, revisits were indicated both when a translator revisited the exemplified segment later in the process and when a translator revisited one or more other segments during the translator's work with the exemplified segment. It should be noted that two revisits mentioned in the process examples are not included here, namely one mentioned in example 12-NL-C-10 and one mentioned in examples 8-NL-E-22 and 26-NL-E-23. In these cases, the translators revisited segments exclusively to copy one or more words and then paste them in the segment they were previously working with. Since this analysis builds on the criteria applied in the analysis of editing speed in which time spent on this type of revisit was not attributed to the revisited segment, these revisits are not included here and thus are not evident on the graphs (cf. Section 5.3.1.1.1).

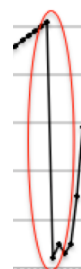
Ex. 1-FAQ-B-14: While Translator B worked with segment 14 in the FAQ text, he returned to segment 9 and deleted a hyphen between "Link" and "stik" (*sockets*) which he had inserted while editing the match in that segment. The match in segment 14 also said "Link stik" without a hyphen, and thus, the translator probably returned to segment 9 to ensure consistency in the use of hyphens in the phrase "Link stik". Afterwards, he placed the cursor in segment 12 and then in segment 14, which he confirmed without changes.



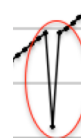
Ex. 6-FAQ-E-39: In the match in segment 39, the MT engine had translated "set" into "indstillet" (*adjusted*). During her first editing of segment 39, Translator E changed "indstillet" to "sat" (*set*). However, after having entered segment 46, she returned to segment 39 and changed it back to "indstillet". The reason was probably that "set" had also been translated into "indstillet" in segments 43 and 44 and that the translator wanted to ensure consistency in the translation of "set". After making this change, she returned to segment 46.



Ex. 13-FAQ-B-2: After having entered segment 51, Translator B returned to segment 2 and replaced the space between "BeoLab" and "14" with a non-breaking space. After this, before returning to segment 51, the translator entered a number of other segments. In most of these, he also inserted non-breaking spaces. Previously in the process, i.e. before reaching segment 51, the translator had not inserted any non-breaking spaces so, possibly, after having entered segment 51, he decided to go back and insert them consistently in product and brand names.



Ex. 16-FAQ-G-19: While working with segment 19, Translator G returned to segment 2 and inserted a non-breaking space between "BeoLab" and

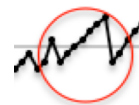


“14”. He then returned to segment 19 and continued to edit the segment. In the retrospective interview, Translator G explained that in segment 19 he remembered that he had forgotten to insert the non-breaking space in segment 2 which was the reason for his revisit to that segment.

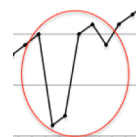
Ex. 22-FAQ-H-23-25: After having worked with segment 25 and carried out a number of match-external actions related to the translation of “position knob”, Translator H returned to segment 23 and changed “bass positionsknappen” (*the bass position knob*) to “basknappen” (*the bass knob*). After making further changes in segment 23, she proceeded to segment 24 where she also wrote “basknappen”. Finally, she entered segment 25 again where she also wrote “basknappen”. Thus, the revisits seemed to be motivated by a wish to ensure terminological consistency.



Ex. 24-FAQ-H-28: When working with segment 28, Translator H consulted the reference text. Then she returned to SDL Trados Studio and placed the cursor in segment 31 (which is similar to segment 28) where she deleted “ovenfor” (*above*). Next, she returned to segment 28 where she made different changes, such as deleting “ovenfor”. Later in the translation process, she again returned to segment 28 and changed “er vist ved” (*is shown by*) to “er vist med” (*is shown with*). She then briefly entered segment 29 and implemented the same change in segment 31. Thus, apparently, by revisiting, she ensured phraseological consistency in segments 28 and 31.



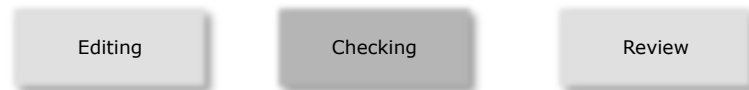
Ex. 4-NL-G-10 & 7-NL-G-9: Translator G’s revisits in these examples are treated together since they are connected. When working with segment 9, the translator wrote “splinternyt” (*brand-new*) as the translation of “next-generation” and copied it. He then entered segment 10, but then returned to segment 1 where he replaced “næste generations” with “splinternyt”. In the retrospective interview, the translator explained that “next-generation” was used in both segments 9 and 1 and therefore he returned to segment 1, probably out of a wish to ensure consistency in the translation of “next-generation”. After this, he entered segment 2 and added “-integration” at the end of “Spotify”. Then he returned to segment 10. After having worked with segment 10 and having entered segment 11, Translator G returned to segment 9 where he inserted a non-breaking space between “Bang” and “&”.



5.4.3 Synthesis and discussion

The analysis addressing RQ3 was based on the analysis of editing speed in Section 5.3 from which it was possible to identify at which points during the translation processes the translators revisited segments, if any. The analysis showed that none of the translation processes was entirely linear since all translators revisited previous segments at least once. A number of examples of revisits were given, drawing on the process examples from Section 5.2. In many of these, the revisits appeared to be motivated by translators wanting to ensure terminological or phraseological consistency. This suggests that they (still) have a holistic view of the text.

As we saw in the literature review in Chapter 3, a number of other studies have also shown that when given the possibility, translators do, in fact, revisit previous segments (Tatsumi 2010; Teixeira 2011; Federico et al. 2012; Läubli et al. 2013; Teixeira 2014b; see also Moran, Lewis, et al. 2014). This is interesting in light of the studies in which it was not possible for translators to revisit previous segments, since this study provides further evidence that this does not reflect translators' natural way of working.



5.5 Checking: Introduction

RQ4 reads:

4. Do the translators check their translations and if so, are changes implemented in this phase essential or preferential?

As defined in Section 4.3.2, the checking phase is the part of the translation process where the translator potentially examines whether the target text is adequate. Thus, in this phase, the translator may check his or her draft translation. However, in an MT-assisted TM environment, when a translator is supplied with a pretranslated text, he or she is in a sense already provided with a draft translation: a draft consisting of matches produced by human translators (TM matches) and matches produced by an MT engine (MT matches). Therefore, the editing phase can to some extent be said to be a process of checking a draft translation. Along the same lines, Mossop argues that the TM translator “unavoidably becomes an Oil Painter” (a translator who types out a translation and then revises it several times), “constantly stopping to revise bits of target-language material inserted from the Memory” (2014, pp.184–185). He adds that this type of translator will typically not have a lot to do in the checking phase because of all the revision he or she has already done during the editing phase (Mossop 2014, p.185). Also, one of the aspects of CAT problematized in the literature is that, because of the segment-by-segment approach, translators are removed from a holistic view of the text and thus might lose track of the text as a coherent whole. This might mean that translators do not find it necessary to check the draft translation in its entirety in a checking phase. Hence, the question is whether translators (still) perform checking when interacting with a MT-assisted TM tool? Also, if translators do, in fact, check their translations in a separate phase, the question is whether the changes made in this phase are essential or preferential?

The investigation of RQ4 draws primarily on the parts of the screen recordings which concern the translators' potential checking phases and to a lesser extent on the retrospective interviews.

5.5.1 Analytical method

The investigation of RQ4 is based on an analysis of the screen recordings. From these recordings, it was identified whether the translators checked their translation drafts after the editing phase. It was also identified whether changes were made in this phase and, if so, how the segments were changed. For the purpose of the analysis, it was necessary to establish a definition of what constitutes a change. Thus, a change was defined as *a difference in word(s), punctuation, formatting or tags between the target segment before the checking phase and the target segment after the checking phase*. This definition was used to identify and quantify implemented changes. When a change in one word resulted in the change of one or more other words, this was counted as one change (e.g. if the noun “engagement” (*involvement*) is changed to “tilgang” (*approach*) and this results in changes in articles and adjectives, all of these changes were regarded as one change). Along the same lines, a change in punctuation was only counted as a change if it was not the result of another change (a syntactical change, for example).

The changes were noted and, inspired by Mesa-Lao et al. (2014) who draw on de Almeida (2013), categorized into *essential changes* and *preferential changes*. A change was considered essential where, had the change not been implemented, the text in the target segment (or part of it) would have either been a) grammatically incorrect (i.e. the language would not have been in accordance with standard conventions regarding, for example, word order, inflections, punctuation and spelling)⁴¹ or b) grammatically correct, but not accurate in comparison to the source text. On the other hand, a change was considered to be preferential if the text in the target segment would still be grammatically correct and an accurate translation of the source text, even if the change had not been implemented.⁴²

To provide intercoder reliability, one of my colleagues, another translation scholar, also categorized the changes implemented by the translators during checking of the FAQ text. Afterwards, we discussed differences in our categorizations and easily reached an agreement. Furthermore, I discussed a number of changes which were not easily categorized with another colleague, also a translation scholar. After these discussions, I crosschecked the categorizations with the retrospective interviews. I did this by drawing on the process analysis conducted to address RQ1 and RQ1a, in which comments made by translators were related to specific segments. This was done in order to check whether the translators’ comments were at odds with my categorizations, i.e., for example, if a translator stated that a change was essential where I had categorized it as preferential. Of the 61 segments in which changes were implemented during the checking phase (as shown in

⁴¹ Thus, I use the notion of grammar in a general sense with “grammatical” meaning “regarded as correct and acceptable by native speakers of the language” (Dictionary.com 2017), i.e. Danish. Here, I draw on the official dictionary of Danish standard orthography *Retskrivningsordbogen* (Dansk Sprognævn 2016).

⁴² De Almeida (2013) and Mesa-Lao et al. (2014) also work with the categories *Essential change not implemented* and *Introduced error*, but since I am not concerned with evaluating the quality of the MT output or of the final translations, but with exploring whether changes implemented during the checking phase are essential or preferential, I confine myself to using the categories of essential and preferential changes.

Appendix 8), we talked about 32 in the retrospective interviews. In 16 of these, the translators specifically mentioned the change(s) implemented during checking, and the translators' comments were in keeping with my categorizations in all cases.

Appendix 8 includes two tables with all segments in which changes were implemented in the checking phase in the FAQ text and in the Newsletter, respectively. In the tables, the translator who made the specific change is mentioned together with the segment number, match type, source segment, target segment before and after checking (with the change(s) marked by grey shading), a short description of the change, the categorization into *essential* and/or *preferential* and the number of changes implemented in the segment. Unlike the rest of the thesis, BTs of the target segments (before and after checking) are not provided here. Instead, the description of the implemented change(s) as well as the grey shading help the reader identify how the target segment was changed. In the tables, tags and/or formatting are only included if the change(s) concerned tags and/or formatting. When more than one change was implemented in a segment, the descriptions of the different changes are separated by a slash (/). If the segment was exemplified in the process analysis in Section 5.2, the example number (e.g. 2-FAQ-D-68) is mentioned below the segment number.

This analysis is product-focused: it focuses on the type of changes implemented and not on the process leading to these changes. Thus, the purpose of the descriptions of the changes included in the tables in Appendix 8 is not to describe the process leading to the change, but to identify what the change consists of. Also, for example, if a translator implemented a change and then reversed it, it is not included in the analysis, since the change is not visible in the final translation product. Moreover, the segments in which changes were implemented are listed in chronological order although the segments were not necessarily changed in that order since the linearity of the changes is not my concern in this analysis. Finally, although a translator might visit a segment more than once during the checking phase and thus implement changes in several steps, all changes in a segment are illustrated together.

5.5.1.1 Limitations

During the retrospective interviews, we did not talk specifically about the checking phase. Rather, the translators watched their process while editing specific segments, and in several instances this led them to comment on changes they made during checking (i.e. later in the process). Had we talked specifically about the checking phase while watching it on the screen, translators might have been able to verbalise their processes during checking to a greater extent. However, translators were in many cases able to verbalise this while commenting on the editing phase (cf. Section 6.4.2). Furthermore, it should be noted that MT was quite new to most of the translators and that this might have influenced the translators' interaction with the tool in terms of the checking phase. For example, this might have caused the translators to invest more time in checking their translations than they would have if they had been more used to working with MT, among other things because they would have had more experience with errors frequently found in MT output and would have been able to spot these errors more easily (cf. Mesa-Lao 2015, p.10).

5.5.2 Results

In Section 5.5.2.1, the part of RQ4 regarding whether the translators performed checking of the FAQ text and the Newsletter is answered. In Section 5.5.2.2, the part of RQ4 regarding the type of changes implemented by the translators is answered together with illustrative examples.

5.5.2.1 (Non-)Presence of a checking phase

Of the seven translators, six carried out checking of both of their translations (Translators A, C, D, E, G and H). Translator B did not carry out checking of either of the texts. The time spent on checking by each translator is visible from Tables 41 and 42 for the FAQ text and the Newsletter, respectively.⁴³

Translator	Minutes spent on editing	Minutes spent on checking	Total time (editing + checking)	Editing in % of total time	Checking in % of total time
A	35.0	3.1	38.1	91.9	8.1
B	25.9	0.0	25.9	100.0	0.0
C	29.0	2.8	31.8	91.1	8.9
D	25.7	6.4	32.1	80.0	20.0
E	34.1	4.3	38.3	88.9	11.1
F	N/A	N/A	N/A	N/A	N/A
G	20.5	4.5	25.1	81.9	18.1
H	41.0	7.6	48.6	84.4	15.6
Average	30.2	4.1	34.3	88.3	11.7
Median	29.0	4.3	32.1	88.9	11.1

Table 41. Minutes spent on checking - FAQ text

Translator	Minutes spent on editing	Minutes spent on checking	Total time (editing + checking)	Editing in % of total time	Checking in % of total time
A	22.5	1.7	24.2	92.9	7.1
B	18.0	0.0	18.0	100.0	0.0
C	19.7	3.2	22.9	85.8	14.2
D	17.3	10.1	27.4	63.1	36.9
E	21.5	2.1	23.6	91.2	8.8
F	N/A	N/A	N/A	N/A	N/A
G	15.2	4.7	19.9	76.4	23.6
H	23.4	4.8	28.3	82.9	17.1
Average	19.7	3.8	23.5	84.6	15.4
Median	19.7	3.2	23.6	85.8	14.2

Table 42. Minutes spent on checking - Newsletter

In the FAQ text, the time spent on checking ranged from 0 minutes (Translator B) to 7.6 minutes (Translator H), with an average of 4.1 minutes, and in the Newsletter, it ranged

⁴³ In accordance with the definition of the checking phase which I established in Section 4.3.2, the checking phase was measured from when the translators returned to the beginning of the translation file after the editing phase until they saved the file before closing it, thus deciding that the translation was finished.

from 0 (Translator B) to 10.1 minutes (Translator D), with an average of 3.8 minutes. When considering how the translators divide their time between editing and checking, it is evident that in relation to the total time, the percentage of time spent on checking ranged from 0% (Translator B) to 20% (Translator D) for the FAQ text with an average of 11.7%. For the Newsletter, in relation to the total time, the percentage of time spent on checking ranged from 0% (Translator B) to 36.9% (Translator D) with an average of 15.4%. Thus, in relation to the total time, Translator D percentage-wise spent the most time on checking both translations, and the translators spent more time on average on checking the Newsletter than the FAQ text. When individual translators are considered in relation to the total time, four translators spent percentage-wise more time on checking the Newsletter text (Translators C, D, G and H), whereas the other two translators spent more time on checking the FAQ text (A and E).

In light of the discussion in Section 3.4.3 regarding potential problems in only considering the editing phase in the analysis of the time translators spend on TM and MT matches, it would have been interesting to explore how much time the translators spend on checking matches of different types. Unfortunately, this was not possible with the applied methods. However, we see that, while Translator B's editing speeds for different match types reflect the total time spent on the tasks since he does not spend time checking the translations, for Translator D, for example, the editing speeds only reflect 80% and 63.1% of the total time spent on the FAQ text and the Newsletter, respectively. Thus, for the translators who spend a higher percentage of their total translation time on checking, the editing speeds, in Moran, Lewis and Saam's (2014) terms, are more overstated than for translators who spend a lower percentage of their time on checking.

As pointed out by Mossop (2014), translators may have different working routines in the sense that some translators make many changes during checking, whereas others are very thorough during editing and then make few changes during checking. When comparing how translators divide their time between editing and checking in the two tasks as shown in Figure 33, we see that the translators who spend a relatively high percentage of their total time (compared to the other translators) on checking in the FAQ text (Translators D, G and H) do so also in the Newsletter, and the translators who spend a relatively low percentage of their total time on checking in the FAQ text (Translators A, B, C and E) do so also in the Newsletter. Thus, the data might indicate that the translators have individual working routines regarding how they divide their time between editing and checking, which seems to be in line with the point made by Mossop (2014).

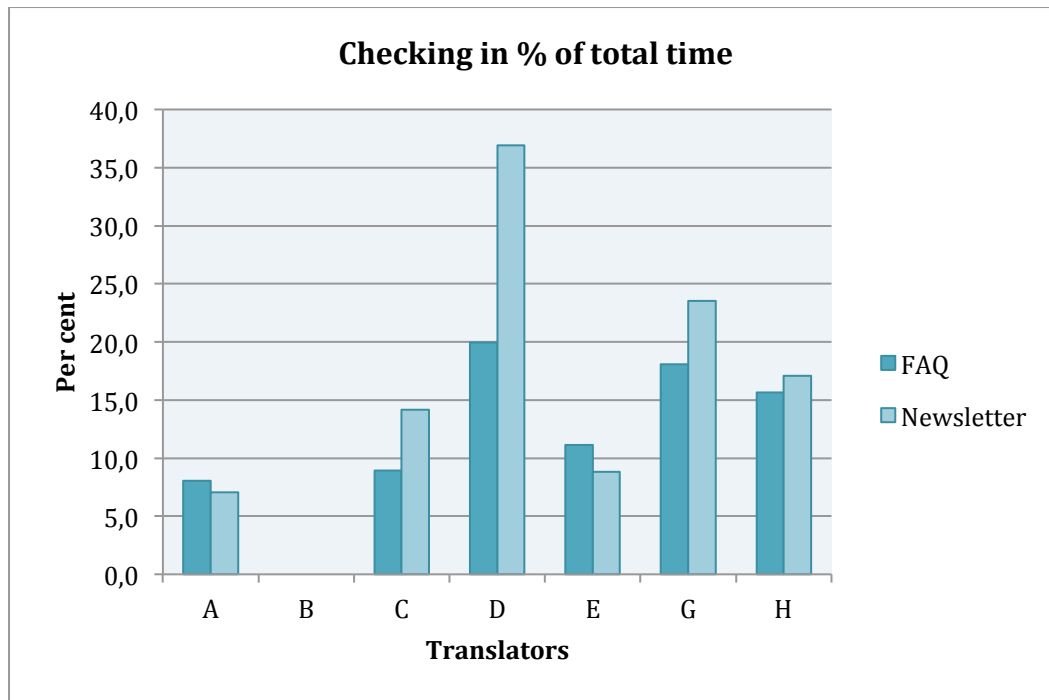


Figure 33. Checking in per cent of total time - FAQ text and Newsletter

5.5.2.2 Essential and preferential changes implemented during the checking phase

The number of essential and preferential changes implemented by each translator is shown in Tables 43 and 44 for the FAQ text and the Newsletter, respectively.

Translator	Essential changes		Preferential changes		Total
A	3	60%	2	40%	5
B	N/A	N/A	N/A	N/A	N/A
C	4	80%	1	20%	5
D	5	35.7%	9	64.3%	14
E	1	33.3%	2	66.7%	3
G	5	83.3%	1	16.7%	6
H	3	75%	1	25%	4
Total	21	56.8%	16	43.2%	37

Table 43. Essential and preferential changes - FAQ text

Translator	Essential changes		Preferential changes		Total
A	0	0%	1	100%	1
B	N/A	N/A	N/A	N/A	N/A
C	3	75%	1	25%	4
D	3	21.4%	11	78.6%	14
E	1	100%	0	0%	1
G	3	30%	7	70%	10
H	1	50%	1	50%	2
Total	11	34.4%	21	65.6%	32

Table 44. Essential and preferential changes - Newsletter

During checking of the FAQ text, all translators made essential changes, ranging from one by Translator E to five by Translators D and G. In the Newsletter, all translators besides

Translator A made essential changes, ranging from one by Translators E and H to three by Translators C, D and G. In total, in the FAQ text and the Newsletter, respectively, 56.8% and 34.4% of the implemented changes were essential, which suggests that, although the editing phase can be assumed to be a process of checking a draft translation, a separate checking phase is still necessary. It should be noted here that a translator implementing a higher number of essential changes in the checking phase should not be interpreted as being less competent than a translator making fewer essential changes in this phase. Firstly, as pointed out by Mossop (2014), translators have different working routines in terms of how they divide their time between editing and checking, and secondly, it has not been analysed here whether, for example, the translators left errors in the target texts which should have been corrected through essential changes.

In total, more essential than preferential changes were implemented during checking of the FAQ text, whereas the opposite was the case in the Newsletter. Although the Newsletter (368 words in the source text) was shorter than the FAQ text (625 words in the source text), the number of changes implemented during checking was similar (37 in the FAQ text and 32 in the Newsletter). Regarding the translators individually, there is no clear picture as to whether they make more essential or preferential changes. However, during checking of both texts, Translators D and G made the highest total number of changes. These translators also spent more of their total time on checking, compared to the others.

In the following, the categorization into essential and preferential changes will be illustrated using examples.

Essential changes

In the vast majority of cases, the categorization into *essential* or *preferential* was easily carried out. For example, Translator A's change in segment 40 in the FAQ text was easily categorized as essential:

Source segment	Target segment before checking	Target segment after checking
If the noise on the LINE or AMP signal is too high, the BeoLab 14 will detect this as sound and not switch off.	Hvis støjen på LINE eller AMP-signalet er for høj, vil BeoLab 14 registere dette som lyd og ikke slukke.	Hvis støjen på LINE eller AMP-signalet er for høj, vil BeoLab 14 registrere dette som lyd og ikke slukke.

The translator inserted an "r" in "registere", which is necessary according to Danish spelling. Hence, the segment would have been grammatically incorrect if the change had not been implemented and the change is thus essential. In other cases, essential changes consisted of deleting redundant words (e.g. Translator H's change in segment 24 in the Newsletter) and inserting missing words (e.g. Translator G's change in segment 40 in the FAQ text).

Other changes were essential, because, had they not been implemented, the target segments would have been inaccurate in relation to the meaning of the source text. For example, Translator H deleted "yderligere oplysninger i" [*additional information in*] in segment 20:

Source segment	Target segment before checking	Target segment after checking
See the Quick guide enclosed with your BeoLab 14.	Se yderligere oplysninger i den korte vejledning, der fulgte med BeoLab 14.	Se den korte vejledning, der fulgte med BeoLab 14.

This change is essential since the target segment contains information that is not present in the source segment. In other words, it is inappropriate and inadequate to tell the target reader to find “additional” information in the Quick guide if he or she has not already been provided with information.

Departing from the principle that the layout of the target text should follow that of the source text, which was also given priority by the translators, changes that made the layout of the target text correspond to the source text were also categorized as essential changes (since without them, the text in the target segment would not have been accurate in comparison to the source text). This included changes which ensured that formatting was the same in the target text as in the source text, that spacing around tags corresponded to the source text and that sentences which did not end with a full stop in the source text also did not do so in the target text (and the other way around)

An example is Translator E’s change in segment 15 in the Newsletter where she deleted a full stop which was not present in the source text:

Source segment	Target segment before checking	Target segment after checking
Explore more details on the new store concept	Se flere detaljer om det nye butikskoncept.	Se flere detaljer om det nye butikskoncept

Changes that made the target text comply with client preferences were also categorized as essential changes since they made the text comply with, so to speak, the client’s grammar and thus, in that sense, would have been grammatically incorrect without them. For example, in segment 2 in the Newsletter, Translator G inserted a non-breaking space between “BeoSound” and “5”:

Source segment	Target segment before checking	Target segment after checking
BeoSound 5 relaunched with Spotify integration	BeoSound 5 – relanceret med Spotify-integration	BeoSound°5 – relanceret med Spotify-integration

As explained by some of the translators and as mentioned in some of the process examples in Section 5.2, some of the translators inserted these non-breaking spaces because Bang & Olufsen prefers to write product names without line breaks, which is also specified in the Bang & Olufsen style guide. Admittedly, not all translators knew about this preference and/or the style guide, since they did not have experience of translating texts from Bang & Olufsen, and thus, such changes were only implemented by some of the translators.

Another change categorized as essential was Translator A’s change in segment 71 in the FAQ text:

Source segment	Target segment before checking	Target segment after checking
For more information, see the Technical Sound Guide.	Yderligere plysninger findes i hurtigvejledningen.	Yderligere lysninger findes i hurtigvejledningen.

During editing, Translator A had written “plysninger” which is incorrect according to Danish spelling (the correct spelling is “oplysninger”). During checking, Translator A used the spell checker, which informed her that “plysninger” was incorrect and suggested “lysninger”. Translator A accepted this, but after the change, the segment was still grammatically incorrect. This change was categorized as essential, since grammatically, a change was necessary; however, the segment was not grammatically correct after the change had been implemented. The change cannot be preferential, since the segment was grammatically incorrect before the change.

Preferential changes

Some of the changes were clearly preferential in the sense that the target segment was grammatically correct and an accurate translation of the source segment before the change. Translator D’s change in segment 6 in the Newsletter was, for example, preferential:

Source segment	Target segment before checking	Target segment after checking
In line with Bang & Olufsen’s dedication to continuing customer service, existing BeoSound 5 owners can easily add Spotify with a free online software update.	I overensstemmelse med Bang & Olufsens fortsatte fokus på kundeservice kan nuværende ejere af BeoSound 5 nemt tilføje Spotify via en gratis onlinesoftwareopdatering.	I overensstemmelse med Bang & Olufsens fortsatte fokus på kundeservice er det nemt for nuværende ejere af BeoSound 5 at tilføje Spotify . Det sker via en gratis onlinesoftwareopdatering.

Translator D changed the expression “kan nuværende ejere af BeoSound 5 nemt tilføje Spotify” (*can existing owners of BeoSound 5 easily add Spotify*) into “er det nemt for nuværende ejere af BeoSound 5 at tilføje Spotify” (*is it easy for existing owners of BeoSound 5 to add Spotify*). Also, she inserted a full stop after “Spotify” and changed the last part of the segment into a separate sentence. These changes were preferential since the segment was already grammatically correct and an accurate translation of the source segment before the changes were implemented. The translator’s process during editing was exemplified in the process analysis in Section 5.2.2.2.3.2.1 (Example 11-NL-D-6).

Other changes were also categorized as preferential, but the appropriate categorization was less clear. An example is the change implemented by Translator G in segment 2 in the FAQ text where he deleted the hyphen in “(PL-2)”:

Source segment	Target segment before checking	Target segment after checking
When I set up BeoLab 14, should I use PL-A (PL1) or PL-B (PL-2)?	Skal jeg anvende PL-A (PL1) eller PL-B (PL-2) , når jeg sætter BeoLab 14 op?	Skal jeg anvende PL-A (PL1) eller PL-B (PL2) , når jeg sætter BeoLab 14 op?

Actually, after this change, the target segment was less accurate compared to the source segment where the hyphen was included. However, earlier in the source segment, “(PL1)” was written without a hyphen, and we can assume that the translator implemented the change to make “(PL2)” consistent with “(PL1)” and that he expected the hyphen in “(PL-2)”

to be an error. This is further supported by the fact that, earlier in the FAQ text, in segments 5 and 6, “PL1” and “PL2” were both written without hyphens. Before this change, the target segment was not grammatically incorrect or inaccurate compared to the source text, and therefore, the change was categorized as preferential.

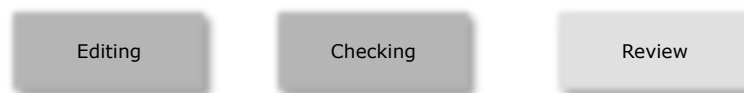
5.5.3 Synthesis and discussion

RQ4 was addressed by analysing screen recordings and categorizing the changes implemented by the translators during the checking phase. The analysis showed that most of the translators checked both of their draft translations in a separate checking phase. The translators spent between 0% and 20% of the total time dedicated to editing and checking on checking in the FAQ text (with an average of 11.7%) compared to between 0% and 36.9% in the Newsletter (with an average of 15.4%). Thus, judging from these results, the editing phase does not seem to have become a process of checking a draft translation to the extent that the translators do not feel that a separate checking phase is necessary. The analysis also indicated that the translators have individual working routines in terms of how they divide their time between editing and checking, as suggested by Mossop (2014).

During checking of the FAQ text, all translators made essential changes, and in the Newsletter, all translators apart from one made essential changes. In the FAQ text and the Newsletter, respectively, 56.8% and 34.4% of the implemented changes were essential, which suggests that, although the editing phase can be said to be a process of checking a draft translation, a separate checking phase is still necessary.

As shown in Section 3.4.2.4, only a few studies have previously explored checking in an MT-assisted TM environment (cf. also Garcia 2008, p.55). For example, Teixeira’s (2011) findings showed that translators spent time checking all match types in an MT-assisted TM environment, and Teixeira’s (2014b) study suggested that checking was more prevalent when translators were provided with metadata than when they were not. Also, although they did not go into depth with the checking phase, Läubli et al. (2013, p.88) noted that in their experiment, the translators made “extensive use” of the possibility of revising their translations as a whole before submission. Other studies which have compared human translation to TM or MT (which were not included in the literature review) have found that the time spent on checking a draft translation decreases when translators translate with a TM (Dragsted 2006; Yamada 2011; Screen 2016) or post-edit MT (Yamada 2011). In Dragsted’s (2006) study, all professional translators and students spent less time on checking when translating with a TM compared to when translating without a TM. However, in her study, the translators were translating into their first foreign language, which might have increased the time spent on checking compared to the current study where the translators translated into their mother tongue. In Yamada’s (2011) study, professional translators translating into their mother tongue devoted 12.8% of their translation time to checking in a TM setting and 10.8% in an MT setting when translating texts from the technical field. This approximates the results of the current study (11.7% spent on checking in the FAQ text and 15.4% in the Newsletter, on average). Screen found that, compared to translators translating without a CAT tool, translators using a TM preferred to “self-review

after completing the first draft of a segment, as opposed to leaving most revision until the end” (2016, p.10) which seems to be in line with Mossop’s comparison of the TM translator to an Oil Painter. Thus, some of the studies suggest that checking becomes less central in a CAT environment, and other studies, like the current one, show that translators still prefer to check their translations in a separate checking phase.



5.6 Amount of editing: Introduction

RQ5 reads:

5. How much do the translators modify TM and MT matches, respectively?

One of the manifestations of the translators’ interaction with the MT-assisted TM tool is how much they modify the different matches, i.e. the amount of editing they perform.⁴⁴ The amount of editing performed in a match can be measured by calculating the so-called *edit distance* between a match and the final translation, reflecting the amount of editing needed to change the match into the final translation. Edit distance is one way of measuring technical effort as defined by Krings (2001) (cf. Section 2.2). In MT literature, edit distance is often used as a measure of the quality of the MT output, since quality “is assumed to have an inverse correlation with the amount of effort needed for the revision” (Kit & Tak-ming 2015, p.225), i.e. if the MT output is of a high quality, we expect a low amount of editing to be needed, and when the edit distance is low, the MT quality is inferred to be high (O’Hagan 2013, p.511; Lacruz et al. 2014, p.74). Edit distance is thus used as a means of evaluating MT that ultimately has to do with quantifying its effectiveness (Kit & Tak-ming 2015, p.213). In the following, the edit distance between the matches offered to the translators in the experiment and the translators’ final translations is measured in order to analyze the amount of editing performed so as to further understanding of the translators’ interaction with the tool.

The investigation of RQ5 draws on the pretranslated texts, i.e. the matches provided to the translators in both the FAQ text and the Newsletter, and the translators’ final translations of both texts.

⁴⁴ In this analysis, I refer to the extent of the translators’ modifications in the matches as the “amount of editing” although this analysis draws on the translators’ final translations of the two source texts and thus on data from both the editing and checking phases. I do so since, in the literature, “amount of editing” is the term usually used to refer to this type of analyses (cf. e.g. Snover et al. 2006; Tatsumi 2010; Koponen 2012; Alves et al. 2016).

5.6.1 Analytical method

Different so-called automatic evaluation metrics have been designed to measure edit distance. In the following analysis, the metric Human-Targeted Translation Edit Rate (HTER), developed by Snover et al. (2006), was chosen to measure edit distance. This metric has been shown to correlate well with human judgements of MT quality (Snover et al. 2006), with the number and types of changes implemented in MT output by translators (Mesa-Lao et al. 2014) and with post-editing productivity (O'Brien 2011). Although originally developed for evaluating MT output, the metric is applied in the current study also to TM matches (as it has also been done by, for example, Tatsumi (2010) and Guerberof Arenas (2012)).

The HTER metric calculates the edit distance by measuring the number of edits (insertions, deletions, substitutions and shifts in words or phrases) needed to change a match into the final translation and dividing the number of edits by the length of the final translation. The match is referred to as the *hypothesis* and the final translation is referred to as the *reference*. HTER then becomes:

$$\text{HTER} = \text{number of edits} / \text{number of reference words}$$

If the hypothesis and the reference match each other exactly, the HTER score is 0, because no edits are needed, and there is no upper limit on the score. In the calculation, punctuation tokens are counted as words and mis-capitalization is counted as an edit (Snover et al. 2006). HTER scores were calculated for all segments using the Asiya Toolkit (Giménez & González 2013), i.e. for all 8 translators' translations of the 76 segments in the FAQ text and 25 segments in the Newsletter. An average HTER score for each segment was then calculated and average scores for the different match types were calculated for each translator and for all the translators combined. Converting textual data to HTER scores may be described as a process of quantitizing qualitative data (cf. Sections 4.2 and 4.3.2).

The following is an example of the calculations of HTER scores, more specifically, from Translator G's translation of segment 61 in the FAQ text, where differences between the hypothesis and the reference are marked in bold:

Source segment:	Disconnect BeoLab 14 from the mains, then reconnect it to the main again.
Match (hypothesis):	Afbryd BeoLab 14 fra lysnet , og sæt den i igen.
Final translation (reference):	Afbryd BeoLab 14 fra strømforsyningen , og tilslut den igen.
HTER score:	3/11 = 0.27

In this example, there is a total of 3 edits: 2 substitutions (*lysnet* by *strømforsyningen* and *sæt* by *tilslut*) and 1 deletion (*i*). With 11 words in the reference (including punctuation tokens), the HTER metric returns a score of $3/11 = 0.27$ for this segment.

5.6.1.1 Limitations

The HTER metric was originally designed to compare MT output with a reference in which the number of edits was minimized, i.e. where the translator was asked to create a "reference that is as close as possible to the MT output while still being adequate and

fluent” (Snover et al. 2009, p.259). The point of asking the translator to minimize the number of edits in the MT output springs from a wish to evaluate the quality of the raw MT output since in this way “only true errors in the MT output are counted” (Snover et al. 2009, p.259). However, in the present study, the translators were not instructed to edit the matches only minimally. Rather, in accordance with the principle of ecological validity, they were instructed to translate the texts as they normally would, i.e. to produce translations of a publishable quality (cf. Section 4.3.1.1.3.1.4.1.2). This might have resulted in more edits than were necessary to reach an adequate and fluent text, and thus, the results do not reflect the performance of the MT engine as envisaged by Snover et al. However, in the current study, the primary point of employing the HTER metric was not to evaluate the quality of the MT output, but to explore how much the translators edit in the TM and MT matches as an expression of their interaction with the tool when they are asked to translate as they would normally do.

It is important to note that the HTER metric does not take the meaning of sentences into account, only their formal structure (Yamada 2011, p.96), and that it “treats all edits equally” which means that “no distinction is made between serious errors (errors in names or missing subjects) and minor edits (such as a difference in verb agreement or a missing determinator)” (Snover et al. 2009, pp.259–260). Also, the metric measures only the distance between the match and the edited version as plain text, which means that it cannot, for example, take changes in tags and/or in formatting such as bold and italics into account. This is an important limitation to keep in mind in the current study in terms of the FAQ text which contained several tags and some formatting. The Newsletter did not contain such elements.

Finally, as stated by Lacruz et al., the HTER metric is extrinsic to the translation process in the sense that it does not measure the steps that were actually carried out by the translators, but “the most efficient path from the MT output to the final post-edited product” (Lacruz et al. 2014, p.74). However, as Lacruz et al. point out, translators often take a route that is not the most efficient. For example, a translator might begin to make edits in the MT output, but then reverse these and accept the match without modifications. Here, the HTER score will be zero, but the actual technical effort was not zero (Lacruz et al. 2014, p.74). Thus, as also observed by Koponen et al. (2012), HTER does not always perfectly reflect the actual technical effort exerted by the translator. Moreover, as observed by Koponen (2012, p.181), HTER may not fully reflect the cognitive effort exerted by the translator, since some errors may be easily identifiable, but involve several technical operations, whereas in other cases, identifying the necessary edits might require considerable cognitive effort, but the required technical operations are quick and easy.

5.6.2 Results

In this section, average HTER scores for all segments in the FAQ text and the Newsletter are first presented. Examples of segments with low and high average HTER scores are then provided and examples of limitations of the analytical method are given. Next, in Section 5.6.2.1, average HTER scores for the different match types are given for each individual

translator and for the translators combined, and in Section 5.6.2.2, the results of the analysis are related to the analysis of editing speed in Section 5.3. The results are synthesized and discussed in Section 5.6.3.

Average HTER scores are provided in Table 45 for all segments in the FAQ text and in Table 46 for all segments in the Newsletter. In the FAQ text, 95% of the segments have an average HTER score of 0.50 or less (72 out of 76 segments), meaning that in most segments translators edited 50% of the match or less. In the Newsletter, 68% of the segments have an average HTER score of 50% or less (17 out of 25 segments). Naturally, these percentages also reflect the distribution of matches into the different match categories in the two texts in the sense that, for example, in the FAQ text, which contained many 100% matches, we would also expect the translators to have a higher percentage of matches with little or no amount of editing compared to the Newsletter, which only contained one 100% match. Examples of matches with low and high average HTER scores are provided below.

Segment	Match type	Average HTER score	Median HTER score	Segment	Match type	Average HTER score	Median HTER score
1	100	0.00	0.00	39	MT	0.20	0.20
2	MT	0.23	0.25	40	MT	0.49	0.49
3	MT	0.50	0.51	41	MT	0.26	0.23
4	MT	0.39	0.29	42	MT	0.16	0.15
5	MT	0.21	0.25	43	MT	0.46	0.50
6	MT	0.00	0.00	44	MT	0.46	0.50
7	100	0.00	0.00	45	100	0.00	0.00
8	100	0.00	0.00	46	92	0.23	0.29
9	MT	0.31	0.29	47	100	0.00	0.00
10	100	0.00	0.00	48	100	0.00	0.00
11	100	0.00	0.00	49	CM	0.00	0.00
12	99	0.19	0.25	50	100	0.00	0.00
13	100	0.00	0.00	51	70	0.53	0.33
14	MT	0.18	0.00	52	MT	0.44	0.44
15	MT	0.23	0.25	53	100	0.00	0.00
16	91	0.39	0.38	54	MT	0.15	0.13
17	100	0.00	0.00	55	MT	0.26	0.27
18	100	0.00	0.00	56	100	0.00	0.00
19	71	0.26	0.25	57	100	0.00	0.00
20	72	0.35	0.25	58	MT	0.26	0.27
21	MT	0.57	0.57	59	100	0.00	0.00
22	100	0.00	0.00	60	MT	0.00	0.00
23	MT	0.31	0.25	61	MT	0.41	0.44
24	79	0.53	0.50	62	88	0.41	0.48
25	98	0.06	0.04	63	MT	0.17	0.13
26	94	0.50	0.50	64	MT	0.30	0.25
27	100	0.02	0.00	65	100	0.00	0.00
28	100	0.20	0.20	66	MT	0.38	0.00
29	94	0.50	0.50	67	100	0.00	0.00
30	100	0.01	0.00	68	MT	0.22	0.25
31	100	0.16	0.06	69	MT	0.13	0.08
32	94	0.50	0.50	70	MT	0.33	0.33
33	100	0.08	0.00	71	80	0.57	0.52
34	99	0.13	0.10	72	100	0.00	0.00
35	95	0.06	0.00	73	MT	0.09	0.13
36	75	0.10	0.10	74	100	0.00	0.00
37	MT	0.41	0.38	75	CM	0.00	0.00
38	100	0.00	0.00	76	100	0.00	0.00

Table 45. Average HTER scores per segment - FAQ text

Segment	Match type	Average	Median
1	MT	0.16	0.18
2	77	0.51	0.50
3	94	0.08	0.06
4	84	0.37	0.38
5	MT	0.34	0.38
6	76	0.56	0.53
7	74	0.52	0.62
8	73	0.70	0.71
9	78	0.41	0.43
10	MT	0.22	0.25
11	MT	0.62	0.57
12	MT	0.62	0.61
13	MT	0.25	0.25
14	MT	0.38	0.34
15	MT	0.49	0.36
16	83	0.36	0.36
17	97	0.04	0.03
18	90	0.25	0.20
19	73	0.44	0.43
20	100	0.18	0.00
21	MT	0.72	0.73
22	MT	0.54	0.50
23	MT	0.42	0.41
24	MT	0.26	0.27
25	MT	0.35	0.30

Table 46. Average HTER scores per segment - Newsletter

Low average HTER scores

As regards low average HTER scores, in the FAQ text, a number of segments had average HTER scores of zero, meaning that none of the translators edited the matches. This occurred primarily in 100% matches. This is not surprising since we would expect these not to be edited. Two MT matches also had average HTER scores of zero, namely segments 6 and 60. In segment 6, the source text was “PL-B (PL2)”, the name of a setting on the Bang & Olufsen product, and the MT match provided was also “PL-B (PL2)”. All translators left this unedited. In segment 60, which is also mentioned below, all translators left the translation of “Product failure:” into “Produktfejl:” (*product failure:*) unedited. In the Newsletter, the segment with the lowest average HTER score was segment 17, a 97% TM match, with an average score of 0.04. In this segment, all translators made the same edit, changing a verb from the present to the past tense, namely “præsenterer” (*presents*), into “præsenterede” (*presented*).

In the FAQ text, in 91.5% of the cases (226 out of 247 segments) where the HTER score was zero, the segment was categorized as belonging to the *accept* category in the process analysis in Section 5.2. In the Newsletter, 75% of the segments with HTER scores of zero (12 out of 16 segments) were categorized as belonging to the *accept* category in the process analysis.⁴⁵ This means that most often, a HTER score of zero coincides with a categorization as belonging to the *accept* category.⁴⁶ However, in the remaining cases, i.e. in 21 segments

⁴⁵ The calculations mentioned here only include results from Translators A, B, C, D, E, G and H, and not Translator F, since his screen recording was deleted after the experiment, and the process analysis could thus not be conducted for him.

⁴⁶ Conversely, since the process analysis only took the translators’ processes during the editing phase into account, there might be matches categorized as belonging to the *accept* category which have a

of the FAQ text and 4 segments of the Newsletter, the process analysis showed that the segments were either revised or rejected, even though they ended up with a HTER score of zero. In these cases, the translators either implemented changes in the match and then reversed the edits (thus ending up with a translation equal to the proposed match as noted by Lacruz et al. (2014)), or they implemented changes related to the placement of tags which the HTER metric cannot take into account (cf. the limitations described above).

An example of the former case is Translator H's editing of the MT match in segment 66 in the FAQ text:

Source segment:	Placement of the indicator light.
Match:	Placering af indikatorlampe.
Final translation:	Placering af indikatorlampe.
HTER score:	0

In this case, the translator wrote "n" at the end of "indikatorlampe" (*indicator light*), changing it into the definite form of the noun, but then deleted the "n" again, thus ending up with a translation equal to the provided match. This resulted in a HTER score of zero, although the technical effort was not zero, and the match was categorized as belonging to the *revise* category in the process analysis.

An example of one of the cases where the translators made changes related to the placement of tags is segment 60 in the FAQ text:

Source segment:	[tag] Product failure:
Match:	Produktfejl:
Final translation:	[tag] Produktfejl:
HTER score:	0

All translators apart from Translator A implemented changes in the match related to the tag shown in the example which was present in the source segment, but had not been included in the match, e.g. by copying the tag from the source segment and pasting it into the target segment. However, since the HTER metric cannot take changes in tags into account, the average HTER score for the segment was zero. This is another example of cases where the technical effort was not zero, although the HTER metric returned a score of zero. In the process analysis, the match was categorized as belonging to the *revise* category for some of the translators and for others to the *reject* category (depending on how they edited the match in order to include the tag).

High average HTER scores

As regards high average HTER scores, in the FAQ text, four segments had average scores of more than 0.5, namely segments 21 (0.57), 24 (0.53), 51 (0.53) and 71 (0.57). In the Newsletter, eight segments had average scores of more than 0.5, namely segments 2 (0.51),

HTER score of more than zero, if the match was edited by the translator during the checking phase. This is, however, not the object of the present analysis.

6 (0.56), 7 (0.52), 8 (0.7), 11 (0.62), 12 (0.62), 21 (0.72) and 22 (0.54). Segments 21 in the FAQ and 21 in the Newsletter are exemplified in the following since these were among the segments with the highest average HTER scores. In both examples, the translation with the highest HTER score is described.

As shown in Figure 34, in the MT match provided in segment 21 in the FAQ text, the Danish verb “se” (*see*) occurs twice which is not an adequate Danish construction, and the match thus requires editing. Translator B had the highest HTER score in this segment (0.77).

Translator B changed the structure of the sentence so that the sentence started with “Se Technical Sound Guide for at få” (*See Technical Sound Guide to get*). In the retrospective interview, the translator explained that for the sake of the target reader, it was better to first indicate where he or she could find the information and not the other way around.

Source segment:	For information about more advanced sound settings, see the Technical Sound Guide.
Match:	Se oplysninger om mere avancerede lydindstillinger, se Tekniske lyd Vejledning .
BT of match:	See information about more advanced sound settings, see Technical sound Guide .
Translation:	Se Technical Sound Guide for at få flere oplysninger om avancerede lydindstillinger.
BT of translation:	See Technical Sound Guide to get more information about advanced sound settings.

Figure 34. Segment 21, Translator B, FAQ text - MT match

As shown in Figure 35, the match provided for segment 21 in the Newsletter is an incomplete Danish sentence and thus requires editing. Translator A had the highest HTER score in this segment (0.83). While editing the match, she selected “om håndværket, der sætter” (*about craftsmanship, which sets*) and deleted it by writing “den højeste håndværksmæssige kvalitet” (*the highest craftsmanship quality*). The translator forgot to write the preposition “om” (*about*). This was corrected by Reviewer D in the review part of the experiment (cf. Section 5.7).

Source segment:	Read more about craftsmanship beyond the ordinary
Match:	Læs mere om håndværket, der sætter
BT of match:	Read more about the craftsmanship, which sets
Translation:	Læs mere den højeste håndværksmæssige kvalitet
BT of translation:	Read more the highest craftsmanship quality

Figure 35. Segment 21, Translator A, Newsletter - MT match

5.6.2.1 Average HTER scores for match types

Tables 47 and 48 show, for the FAQ text and the Newsletter respectively, each translator’s individual average HTER scores for each match type. The tables also present the total average and median values for each match type for the translators combined as well as standard deviations.

FAQ	A	B	C	D	E	F	G	H	Total average	Median	Standard deviation
CM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100%	0.01	0.00	0.01	0.03	0.00	0.04	0.02	0.03	0.02	0.02	0.01
95-99%	0.07	0.00	0.06	0.20	0.18	0.16	0.07	0.11	0.11	0.09	0.07
85-94%	0.41	0.37	0.37	0.51	0.44	0.45	0.45	0.37	0.42	0.42	0.05
75-84%	0.42	0.28	0.45	0.31	0.31	0.40	0.52	0.49	0.40	0.41	0.09
70-74%	0.30	0.28	0.27	0.22	0.84	0.27	0.47	0.42	0.38	0.29	0.20
MT	0.29	0.32	0.20	0.32	0.22	0.39	0.25	0.28	0.28	0.28	0.06

Table 47. Average HTER scores for match types - FAQ text

Newsletter	A	B	C	D	E	F	G	H	Total average	Median	Standard deviation
100%	0.00	0.00	0.00	0.67	0.00	0.75	0.00	0.00	0.18	0.00	0.33
95-99%	0.03	0.03	0.03	0.03	0.03	0.03	0.09	0.03	0.04	0.03	0.02
85-94%	0.22	0.07	0.13	0.28	0.23	0.14	0.09	0.15	0.16	0.14	0.07
75-84%	0.45	0.39	0.42	0.48	0.44	0.42	0.44	0.50	0.44	0.44	0.04
70-74%	0.59	0.59	0.44	0.59	0.59	0.58	0.49	0.59	0.56	0.59	0.06
MT	0.44	0.41	0.40	0.51	0.29	0.47	0.31	0.48	0.41	0.42	0.08

Table 48. Average HTER scores for match types - Newsletter

In the **FAQ text**, for CM, 100% and 95-99% matches, the average HTER scores for all translators combined are 0.00, 0.02 and 0.11, respectively. The average scores for 85-94%, 75-84% and 70-74% matches are 0.42, 0.40 and 0.38, respectively, and for MT matches, the average HTER score is 0.28. Thus, in terms of the FAQ text, based on average scores for all the translators combined, the study suggests that less editing is needed in MT matches than in TM matches up to 94%, and that the amount of editing needed in 85-94%, 75-84% and 70-74% matches is similar. Large individual differences between the individual translators' average HTER scores are generally not found, although Translator E's average HTER score of 0.84 for 70-74% matches is clearly higher than the others'. This is also reflected in the median for this match type (0.29) which is somewhat lower than the average for all the translators combined (0.38). Regarding the individual translators' average scores in MT matches, for five of the translators (A, C, E, G and H), the HTER score in MT matches is lower than for TM matches up to the 85-94% match category, meaning that these translators edit less in MT matches than in the mentioned TM match categories. For the remaining three translators (B, D and F), the HTER score for MT matches is lower than for 85-94% matches, but higher than or close to equal to the scores for 70-74% and 75-84% matches. Thus, these translators edit less in MT matches than in 85-94% matches, but more in MT matches than in 70-74% matches and (for Translators B and D) 75-84% matches. In terms of the TM/MT threshold, since the average values for all the translators combined show that the translators edit less in MT matches than in TM matches with match values up to 94%, the present analysis suggests that it should be set somewhat higher than 70%. However, this needs to be considered in the light of the results for, for example, editing speed, and the limitations of the method mentioned. These points are addressed further in Section 5.6.2.2.

In the **Newsletter**, for all translators combined, the average HTER score for 100%, 95-99% and 85-94% matches are 0.18, 0.04 and 0.16, respectively. The average HTER scores for 75-84% and 70-74% matches are 0.44 and 0.56, respectively, and for MT matches, the average HTER score is 0.41. Thus, in the Newsletter, the translators edit less in MT matches than in TM matches with match values up to 84%. Large differences between the translators' average HTER scores in the different match types are generally not observed. However, in the 100% match category, Translators D and F have clearly higher HTER scores (0.67 and 0.75, respectively) than the other translators (all 0.00), reflecting that D and F edited a rather large part of the one 100% match included in the Newsletter, whereas the other translators left it unedited. This also explains why the average HTER score for 100% matches for all translators combined is 0.18, which is higher than the average score for 95-99% and 85-94% matches. When we look at the individual translators' average scores in MT matches, we see that they all edited less in MT matches than in 70-74% matches, and that five of the translators (A, C, E, G and H) also edited less in MT matches than in 75-84% matches. The other three translators (B, D and F) edited more in MT matches than in 75-84% matches. In terms of the TM/MT threshold, the present analysis might suggest that it should be set higher than 70%, but as mentioned above, this needs to be combined with results on editing speed and seen in the light of the limitations of the method.

Overall, we would expect the average HTER score to increase as the TM value decreases, i.e. we would expect translators to edit more in TM matches with lower match values than in matches with higher match values. Bar charts illustrating the average HTER scores for each match category for all translators combined are provided in Figures 36 and 37 for the FAQ text and the Newsletter, respectively.

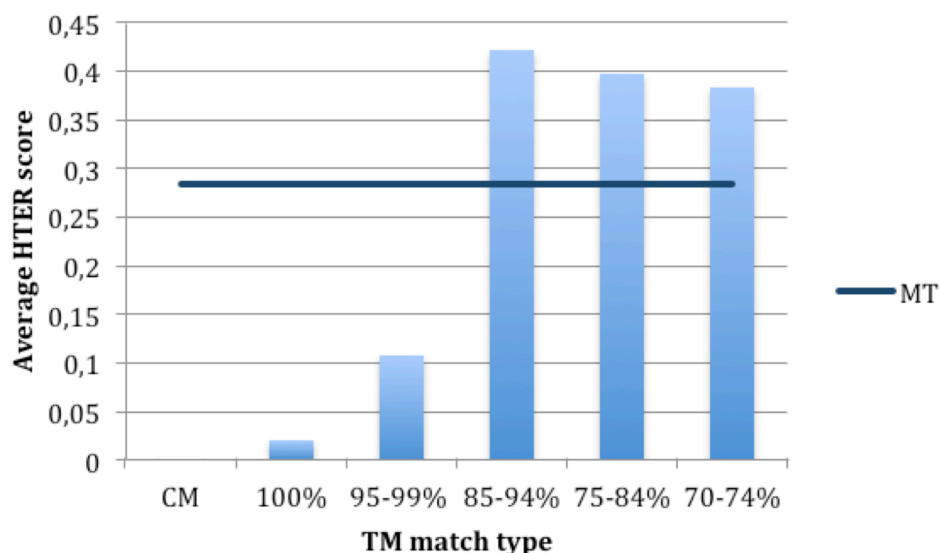


Figure 36. Match categories and average HTER scores - FAQ text

As can be seen in Figure 36, in the FAQ text, the average HTER score increases from the CM match category (0.00) over 100% matches (0.02) and 95-99% (0.11) matches until the 85-94% match category (0.42). However, the average HTER score then decreases slightly in the

75-84% and 70-74% match categories, meaning that the translators edited less in these matches than in the TM matches with higher match values. As mentioned above, the average HTER score for MT matches is lower than for 70-74%, 75-84% and 85-94% matches, meaning that the translators edited less in MT matches than in these TM match types.

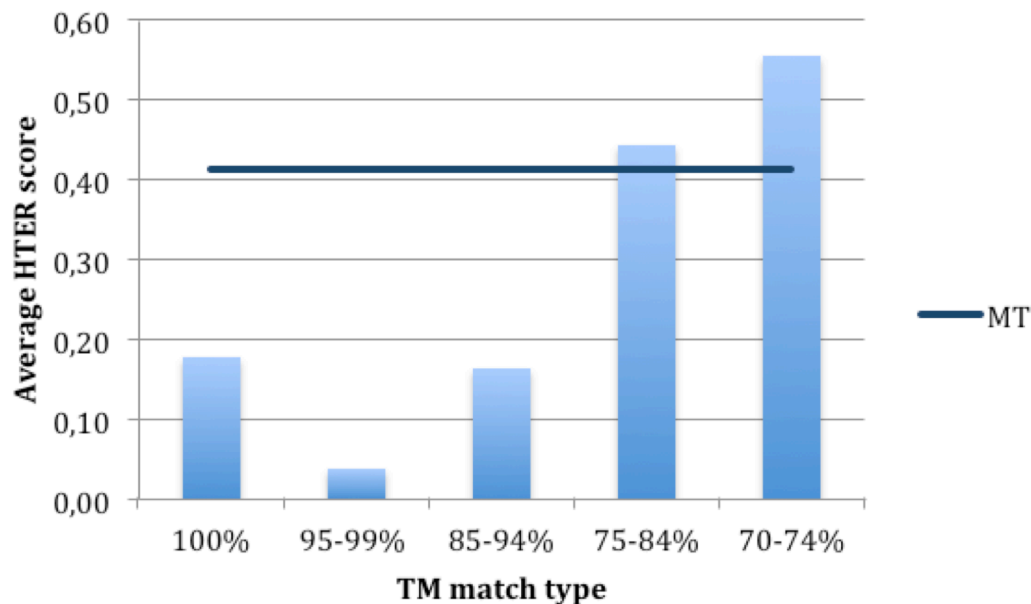


Figure 37. Match categories and average HTER scores - Newsletter

As shown in Figure 37, in the Newsletter, apart from the high average HTER score for 100% matches which was discussed above, we see an increase in average HTER scores from the 95-99% to the 70-74% TM match category. Thus, the translators edit more in TM matches with lower match values than in matches with higher match values. As mentioned above, the average HTER score for MT matches is lower than for 70-74% and 75-84% matches and higher than for the remaining TM match types.

When comparing the FAQ text and the Newsletter in terms of average HTER scores for all translators combined, we see that the translators edited more in 100% matches in the Newsletter than in the FAQ text. However, this has to do with two translators' high scores in the one 100% segment in the Newsletter, mentioned above. The translators edited more in 95-99% and 85-94% matches in the FAQ text than in the Newsletter, whereas they edited more in 75-84%, 70-74% and MT matches in the Newsletter than in the FAQ text. Thus, the data show no clear picture as to whether the translators edited more in one or the other text. Further, although the translation of the Newsletter which had been produced prior to the experiment had been included in the TM used to train the MT engine, as mentioned in Section 4.3.1.1.3.1.3, judging from the HTER scores, we see no indication that the MT matches in the Newsletter were of a higher quality than the MT matches in the FAQ text, however, of course we do not know what the data would have shown if this had not been the case.

5.6.2.2 Amount of editing and editing speed

In the analysis of editing speed (Section 5.3), it was evident that, in the FAQ text, the translators' editing speeds for MT matches and 70-74% TM matches were almost the same, with a slightly higher editing speed for MT matches. The editing speed for MT matches was lower than for the remaining TM match types. When we relate this to the average edit distances for the different match types, it is clear that, although the editing speed for MT was similar to or lower than for TM matches, the average HTER score for MT matches was lower than for 70-74%, 75-84% and 85-94% matches. In the analysis of editing speed in the Newsletter, it was evident that the editing speed for MT matches was considerably lower than the editing speed for all TM match types. However, the average HTER score for MT matches was lower than for 70-74% and 75-84% TM matches.

This means that although the translators spent approximately the same amount of time or more time on editing MT matches than they did on editing TM matches, they ended up editing less in the MT matches than in 70-74% and 75-84% TM matches (and in 85-94% matches in the FAQ text). This indicates that the translators spent relatively more time considering and/or implementing the necessary edits in the MT matches. This might have a number of different potential explanations. For instance, in TM matches, as opposed to MT matches, metadata are provided, i.e. the textual differences between the current source segment and the source segment stored in the TM are displayed which might make it possible for translators to identify the necessary edits more quickly than in MT matches. Also, the process analysis showed that compared to most of the TM match types, the translators more often edited MT matches by means of match-external revision, i.e. they made use of resources or functionalities external to the match in order to produce their translation which might have caused them to spend more time on MT matches. Another possible explanation might be that, in MT matches, translators spent more time on ensuring that the target segment contained the correct tags and/or formatting than they did in TM matches, since the HTER metric does not take differences in tags and/or formatting into account. Previous studies such as Guerberof Arenas (2013) and O'Brien and Moorkens (2014) have indicated that tags constitute a typical problematic issue when working with MT and this issue might be at play here. This aspect is also addressed in Section 5.8 which investigates RQ7 regarding the translators' attitudes to the MT-assisted TM tool.

In terms of the TM/MT threshold, in the FAQ text, the analysis of editing speed suggested that it might be preferable to set it at 75% since the translators edited MT matches slightly more quickly than 70-74% matches. Also, as mentioned above, the process analysis showed that the translators needed match-external support more frequently in 70-74% matches than in MT matches, which pointed in the same direction. When we combine this with the results on the amount of editing in the different matches, this still seems preferable, since the translators edited less in MT matches than in 70-74% matches. In terms of the Newsletter, the analysis of editing speed showed no indication that the TM/MT threshold should be set higher than 70%, since the editing speed for MT matches was considerably lower than for any TM match category. Also, the process analysis revealed that the translators needed match-external support more frequently in MT matches than in any TM match type. When combined with the results on the amount of editing, the results point in

different directions, since the translators edited less in MT matches than in 70-74% and 75-84% matches. However, since the time spent on translation tasks is typically assigned higher importance than, for example, the number of changes implemented during translation, it does not seem preferable to set the threshold higher than 70%.

5.6.3 Synthesis and discussion

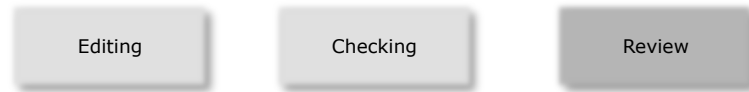
The analysis which addresses RQ5 was based on a comparison of the pretranslated texts and the translators' final translations of the FAQ text and the Newsletter using the HTER metric. Average HTER scores were calculated for each segment and for the different match types. The analysis showed that in the FAQ text, 95% of the segments had an average HTER score of 0.50 or less, meaning that, in most segments, translators edited 50% of the match or less. In the Newsletter, this was the case for 68% of the segments. Examples of segments with low and high average scores were provided and, among other things, these examples highlighted limitations of the HTER method, for instance in relation to tags.

When average values for the different match types were calculated for all translators combined, the analysis showed that, in the FAQ text, the translators edited less in MT matches than in TM matches up to 94%, and that the amount of editing needed in 85-94%, 75-84% and 70-74% matches was similar. In the Newsletter, the average score for MT matches was lower than for 75-84% and 70-74% matches. This means that in both texts, the translators edited less in MT matches than in 70-74% and 75-84% matches, and in the FAQ text, also than in 85-94% matches. In the FAQ text, the average HTER scores increased from the CM match category over 100% and 95-99% matches to the 85-94% match category, after which it decreased slightly in the 75-84% and 70-74% match categories. Thus, the translators edited less in 75-84% and 70-74% than in 85-94% matches. In the Newsletter, apart from a high average HTER score for 100% matches, the average HTER score increased from the 95-99% to the 70-74% match category. Thus, the translators edited more in TM matches with lower match values than in matches with higher match values.

When the results of this analysis were related to the analysis of editing speed, it was observed that although the translators spent a similar amount of time or more time editing MT matches than editing TM matches, they ended up editing less in the MT matches than in the 70-74% and 75-84% matches, and in the FAQ text, also than in 85-94% matches. This indicated that the translators spent relatively more time considering and/or implementing the necessary edits in MT matches. A number of possible explanations for this were addressed such as the presence of metadata in TM matches and the limitation of the HTER metric that it cannot take changes in tags and/or formatting into account.

Compared to previous studies, the amount of editing implemented by the translators in MT matches seems similar to the scores reported in Tatsumi (2010). Tatsumi used the GTM metric and found that translators edited about one-third of the MT output. However, in Tatsumi's study, the translators generally edited more in MT matches than in TM matches above 75%, which is not the case in the current study. Guerberof Arenas (2012) used the HTER metric and compared HTER scores for MT matches with HTER scores for 85-94% TM

matches. She found that the translators in her study made more edits in 85-94% TM matches than in MT matches, with average HTER scores of approx. 0.26 and 0.22, respectively. In the current study, the translators also made more edits in 85-94% TM matches than in MT matches in the FAQ, but not in the Newsletter.



5.7 Review: Introduction

RQ6 reads:

6. How much time do the translators spend on reviewing their colleagues' translations and are changes implemented in this phase essential or preferential?

As we saw in the literature review in Section 3.4.2, the review phase has not been given much attention within research on MT-assisted TM translation, and in general, there has been little investigation of review in the workplace setting (Rasmussen & Schjoldager 2011, p.87; Ehrensberger-Dow 2014, p.362). Also, in a 2008 paper, referring to what is termed review in the current study, Garcia stated that “[a] thorough review of the literature has found no empirical study of revision within the localisation/TM environment” (2008, p.54). However, review is an essential component in professional quality assurance (Garcia 2008; Rasmussen & Schjoldager 2011), and the importance of review has gained recognition with the publication of the European standard for translation services in 2006 (EN 15038) (Robert 2013). Also, Garcia argues that the reviewer is “responsible for making a coherent whole of the several segments into which the text has been divided” (2008, p.58). On the other hand, when editing of TM and MT matches can be regarded as a type of other-revision or review (Mossop 2014, pp.199–203), the question is what happens during review and whether review is (still) a central part of the translation process? At TextMinded, review was part of the typical workflow (called *tandem translation* as explained in Section 5.1.2) and the LSP did not plan to change this after implementing MT. Against this backdrop, in the following, the reviewers’ interaction with the MT-assisted TM tool is explored as it manifests itself in the time spent on review and in the type of changes implemented in this phase.

The investigation of RQ6 draws primarily on the reviewed translations (with implemented changes marked through Track Changes), i.e. four reviewed translations of the FAQ text and four reviewed translations of the Newsletter, as well as on the time spent on Review which was self-reported by the reviewers. To a lesser extent, the analysis draws on the retrospective interviews from the translation part of the experiment.

5.7.1 Analytical method

To a large extent, the investigation of RQ6 follows the same analytical method as that of RQ4. The reviewers self-reported the time spent on review, and the changes implemented in

the review phase were identified from the reviewed translations. The implemented changes were easily identifiable, since the reviewers applied Track Changes in SDL Trados Studio during review. Afterwards, the changes were categorized as either *essential* or *preferential* following the same criteria as outlined in Section 5.5.1. Changes whose categorization was not obvious were discussed with a colleague of mine, another translation scholar. Furthermore, I drew on the retrospective interviews in my categorizations in the sense that if the reviewers had made comments (during their retrospective interviews in the translation part of the experiment) which explained their implemented changes, these were taken into consideration.

Appendix 9 includes all segments in which changes were implemented in the review phase in the FAQ text and in the Newsletter. The appendix is presented as tables and indicates the reviewer, translator, segment number, match type, source segment, target segment before and after review, a short description of the change (with the change(s) marked by grey shading), the categorization into *essential* and/or *preferential* and the number of implemented changes in the segment. If the translator's process was exemplified in the process analysis in Section 5.2, the example number (e.g. 2-FAQ-D-68) is given below the segment number.

5.7.1.1 Limitations

Since this analysis relies on analysing reviewed translation *products*, I have no knowledge of the review *process*. For example, I have no knowledge of whether the reviewers conducted a monolingual or bilingual review or a mix thereof, or whether some reviewers went into greater detail than others. Regarding self-reported time spent on the review, I do not know, for example, whether the reviewers were disturbed during their work. In relation to the quantitative analysis of the number of essential and preferential changes implemented by the reviewers, it is important to note that, since different translators translated the reviewed texts, the need for changes in each text may have varied. Since the purpose of this analysis was not to evaluate the quality of the translations or the reviewed translations, but to explore the type of changes implemented by reviewers in this phase, the number of errors in the translations was not, for example, analysed, and I was also not concerned with whether the reviewers had introduced errors. Furthermore, it might have been an advantage to have had more than one reviewer review each translation in order to learn about potential differences in review behaviour. Finally, the fact that the reviewers had earlier translated the source text themselves may have influenced their reviews. However, the review part of the experiment was conducted approximately three months after the translation part in an attempt to counter this possible influence.

5.7.2 Results

In Section 5.7.2.1, the time spent on review is presented. In Section 5.7.2.2, the results of the analysis of the type of changes implemented during review are presented together with illustrative examples.

5.7.2.1 Time spent on review (self-reported)

The reviewers were instructed to review the translation as they normally would review that type of text and to self-report the number of minutes they spent reviewing the assigned translation. As shown in Tables 49 and 50, respectively, the four reviewers who reviewed a translation of the FAQ text spent between 6 and 30 minutes (with an average of 20 minutes), and the reviewers who reviewed a translation of the Newsletter spent between 3.5 and 36 minutes (with an average of 15.6 minutes). I was rather surprised that the differences in the time spent on review were so large (with, for example, Reviewer A spending 5 times the time of Reviewer B on reviewing a translation of the FAQ text, and Reviewer D spending more than 10 times the time of Reviewer F on reviewing a translation of the Newsletter). When Reviewer A sent me the reviewed translation and her indication of the time spent, she added that she might have spent a little more time than normal, because she did not usually translate for Bang & Olufsen, and Reviewer H wrote that she spent around 5 of the 24 minutes on revising tags. Apart from that, since I was not present during review and since the processes were not recorded using screen recording, I have no indication of why the differences in time spent on review were so large, and whether the reviewers usually spent a very different amount of time on reviews.⁴⁷

Reviewer	Text	Translator	Minutes spent on review (self-reported)
A	FAQ	D	30
B	FAQ	E	6
G	FAQ	C	20
H	FAQ	F	24
Mean			20
Median			22

Table 49. Time spent on review - FAQ text

Reviewer	Text	Translator	Minutes spent on review (self-reported)
C	Newsletter	G	12
D	Newsletter	A	36
E	Newsletter	B	11
F	Newsletter	H	3.5
Mean			15.6
Median			11.5

Table 50. Time spent on review - Newsletter

5.7.2.2 Essential and preferential changes implemented during review

As shown in Tables 51 and 52, all reviewers implemented changes in the translation they were assigned. Apart from Reviewer E, all reviewers implemented essential changes during review, ranging from 6 (Reviewer A) to 27 (Reviewer G) essential changes in the FAQ text and from 2 (Reviewer G) to 8 changes (Reviewer F) in the Newsletter. However, it should be noted that 17 of Reviewer B's 18 essential changes, 17 of Translator G's 27 essential changes and 7 of Reviewer F's 8 essential changes related to instances when the reviewers inserted non-breaking spaces into brand and product names. As explained in Section 5.5.2.2, such changes were categorized as essential, since it was clear from the retrospective interviews and the Bang & Olufsen style guide that product names should be written like this. However, Reviewers B, F and G were the reviewers with most experience of translating for Bang & Olufsen (as indicated in the post-experimental questionnaire, cf. Section 5.1.3), and this probably explains why these reviewers made many changes of this type.

⁴⁷ Cf., however, Section 6.5.

In total, the implemented changes were mainly essential in the FAQ text (62.7%), whereas they were mainly preferential in the Newsletter (60%). However, if we do not take the changes involving non-breaking spaces mentioned above into account, more preferential than essential changes were also made in the FAQ text.

Reviewer	Essential changes		Preferential changes		Total
A	6	42.9%	8	57.1%	14
B	18	100%	0	0%	18
G	27	50.9%	26	49.1%	53
H	13	76.5%	4	23.5%	17
Total	64	62.7%	38	37.3%	102

Table 51. Essential and preferential changes - FAQ text

Reviewer	Essential changes		Preferential changes		Total
C	2	50%	2	50%	4
D	6	23.1%	20	76.9%	26
E	0	0%	2	100%	2
F	8	100%	0	0%	8
Total	16	40%	24	60%	40

Table 52. Essential and preferential changes - Newsletter

During the contextual study, as it appears from my field notes, Translator F mentioned that he generally finds it “thankless” to review translations in the two-column format in SDL Trados Studio (i.e. with the source text on the left and the target text on the right) and that normally, if he has the time, he also takes a look at how the target text will appear when the target text is generated. However, the translators normally reviewed texts in the two-column format as they did in the experimental study. Further, interestingly, it appears from my field notes that during the webinars on MT and post-editing which I attended during the first week of the workplace study, Translator D posed the question when MT would be of such a high quality that review would not be necessary. However, as mentioned in Section 5.1.1, TextMinded had no plans of changing their typical workflow which always included review.

In the following, the categorization into essential and preferential changes will be illustrated using examples.

Essential changes

Some of the changes categorized as essential were clearly corrections of grammatical errors such as the change implemented by Reviewer H in segment 41 of Translator H’s translation of the Newsletter:

Source segment	Target segment before review	Target segment after review
For more information, see the Technical Sound Guide.	Du finder flere oplysninger Technical Sound Guide.	Du finder flere oplysninger i Technical Sound Guide.

In this segment, Reviewer H inserted the preposition “i” (*in*) which is necessary according to Danish grammar since the verb “at finde” (*to find*) in this construction requires a prepositional phrase introduced by a preposition such as “i”.

Other changes were essential because the segment was inaccurate compared to the source segment before the change. This was the case for one of Reviewer B's essential changes in segment 40 of Translator E's translation of the FAQ text:

Source segment	Target segment before review	Target segment after review
If the noise on the LINE or AMP signal is too high, the BeoLab 14 will detect this as sound and not switch off.	Hvis støjen på LINE- eller AMP-signalet er for høj, registrerer BeoLab 14 det som lyd og slukker.	Hvis støjen på LINE- eller AMP-signalet er for høj, registrerer BeoLab®14 det som lyd og slukker ikke.

This segment was exemplified in the process analysis described in Section 5.2.2.2.3.3.2 (Example 15-FAQ-E-40) where it was noted that Translator E only wrote “slukker” (*switch off*) and not “slukker ikke” (*not switch off*), which changed the meaning of the sentence. Reviewer B rectified this during review. Reviewer B also inserted a non-breaking space instead of the space between “BeoLab” and “14”.

A few other changes were classified as essential based on the translators' comments from the retrospective interviews. For example, Reviewer G explained in the interview that he deleted “min” and “mit” (both: *my*) because Bang & Olufsen prefers to keep texts more impersonal in Danish. This was also clear from his review of Translator C's translation of the FAQ text, for example from segment 39:

Source segment	Target segment before review	Target segment after review
Why does my BeoLab 14 not switch to standby after 3 minutes with no sound, when the MODE switch is set to LINE or AMP?	Hvorfor skifter <u>min</u> BeoLab 14 ikke til standby efter 3 minutter uden lyd, når MODE omskifteren er indstillet til LINE eller AMP?	Hvorfor skifter BeoLab®14 ikke til standby efter 3 ^o minutter uden lyd, når MODE omskifteren er indstillet til LINE eller AMP?

Apart from deleting “min”, Translator G also inserted a non-breaking space between “BeoLab” and “14” for the reasons explained in Section 5.5.2.2. Both of these changes made the target segment comply with client preferences. Finally, he inserted a non-breaking space between “3” and “minutter” (*minutes*). Reviewer G explained that he often inserted non-breaking spaces between numbers and the following words because it looks better, stressing that there was no rule requiring him to do so; it was a matter of preference, he explained. Thus, this change was categorized as preferential.

Preferential changes

Reviewer D's change in segment 23 of Translator A's translation of the Newsletter was categorized as preferential:

Source segment	Target segment before review	Target segment after review
Against more than 4000 competing products and projects from 54 countries, BeoPlay V1 took home the winning prize with the coveted red dot award for product design 2013.	I konkurrence med over 4000 produkter og projekter fra 54 lande tog BeoPlay V1 vinderprisen i den eftertragtede red dot design award for bedste produkt design i 2013.	I konkurrence med over 4000 produkter og projekter fra 54 lande vandt BeoPlay V1 den eftertragtede red dot design award for bedste produkt design i 2013.

Here, Reviewer D changed “tog BeoPlay V1 vinderprisen i” (*took BeoPlay V1 the winning prize in*) to “vandt BeoPlay V1” (*won BeoPlay V1*). After the change, the segment is more idiomatic in Danish, but since the segment was not grammatically incorrect or inaccurate compared to the source segment before the change, the change was categorized as preferential.

Another change categorized as preferential was Reviewer A’s change in segment 27 of Translator D’s translation of the FAQ text:

Source segment	Target segment before review	Target segment after review
Use this setting if the subwoofer is close to one surface (freestanding in a room or on a wall).	Brug denne indstilling, hvis subwooferen er placeret tæt på én overflade (fritstående på gulvet eller hængende på en væg).	Brug denne indstilling, hvis subwooferen er placeret tæt på én overflade (fritstående i et lokale eller hængende på en væg).

The reviewer changed “på gulvet” (*on the floor*) to “i et lokale” (*in a room*). This was categorized as preferential since the semantic meaning is the same after the change, i.e. the segment was not inaccurate compared to the source segment before the change.

Finally, the changes implemented by Reviewer G in segments 28, 31 and 34 of Translator C’s translation of the FAQ text were categorized as preferential:

Source segment	Target segment before review	Target segment after review
Shown by light grey areas in the illustration.	Det er vist med de lysegrå områder i illustrationen ovenfor.	Dette er vist med de lysegrå områder i illustrationen ovenfor.
Shown by medium grey areas in the illustration.	Dette viser de mellemgrå områder i illustrationen ovenfor.	Dette er vist med de mellemgrå områder i illustrationen ovenfor.
Shown by the dark grey areas in the illustration.	Det er vist med de mørkegrå områder i illustrationen ovenfor.	Dette er vist med de mørkegrå områder i illustrationen ovenfor.

Through his changes, the reviewer ensured that all three segments followed the same structure, namely “Dette er vist med” (*This is shown by*). In this way, Reviewer G ensured consistency which appears appropriate in this situation; however, the changes were categorized as preferential, since the segments were not grammatically incorrect or inaccurate before the changes.

5.7.3 Synthesis and discussion

The analysis addressing RQ6 was based on an analysis of the reviewed translations and a categorization of the changes implemented by the reviewers. The analysis showed that the reviewers differed rather substantially in the amount of time they spent on reviewing the two translations. All reviewers implemented changes in the text they were assigned and, interestingly, almost all reviewers implemented changes that were categorised as essential. Thus, the analysis suggests that review is a necessary part of the MT-assisted TM translation process.

5.8 Translator Attitudes to TCI: Introduction⁴⁸

RQ7 reads:

7. What are the translators' attitudes to TCI in the form of MT-assisted TM translation?

It is generally assumed that translators' attitudes to technology impact on their interaction with the technology (Beesley 1986; Hutchins & Somers 1992; Lange & Bennett 2000; Guerberof Arenas et al. 2012; Doherty & Moorkens 2013; Teixeira 2014b). Teixeira (2014b, p.30) even states that attitudes to technology might be as important as technology itself in the sense that negative attitudes to the technology might negatively influence the translators' interaction with it. Thus, translator attitudes appear to be central in the implementation of new technologies as the one TextMinded was going through at the time of the workplace study. Eagly and Chaiken define an attitude as a "psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" (1995, p.414). The evaluated entity is by Eagly and Chaiken termed an "attitude object" and thus "attitudes are people's evaluations of attitude objects" (1995, p.414). In the following analysis, the favour and/or disfavour expressed by the translators towards the attitude object of TCI in the form of MT-assisted TM translation is analysed. Inspired by Olohan (2011), who, as we saw in the literature review in Chapter 3, applies Pickering's (2005) "mangle of practice" theory in her analysis of translators' interaction with translation technology, viewing this interaction as a "dance of agency" in which a human agent (translator) interacts with a non-human agent (the technology) in a process of resistance and accommodation, the analysis also focuses on how translators accommodate resistances offered by the MT-assisted TM tool. Several studies have contributed to our knowledge of translators' attitudes to translation technology by highlighting different aspects of TCI which translators evaluate with favour and disfavour (Dillon & Fraser 2006; Lagoudaki 2008; Christensen & Schjoldager 2011; Doherty & Moorkens 2013; Guerberof Arenas 2013; LeBlanc 2013; Teixeira 2014b). The following analysis aims to contribute further to this knowledge.

The investigation of RQ7 draws primarily on the retrospective interviews and to a lesser extent on my field notes from the contextual study and the translators' written answers to the two questions in the post-experimental questionnaire (questions 16 and 17) concerning their attitudes to MT and their expectations about the consequences of MT for their futures as translators (cf. Appendix 4).

5.8.1 Analytical method

The investigation of RQ7 fell in two parts. Firstly, the transcribed retrospective interviews, field notes and the translators' written answers to question 16 in the post-experimental questionnaire concerning their attitudes to MT were analysed adopting a template analysis approach (King 1998; Crabtree & Miller 1999; King 2004; King 2012; Brooks & King 2012). The template analysis method applied is explained in this section. Secondly, the template

⁴⁸ This analysis will also be published in Bundgaard (in press).

analysis results were supplemented with a synthesis of the translators' answers to question 17 about their expectations relating to the consequences of MT for their future careers as translators.

Template analysis is a form of thematic analysis aimed at the qualitative analysis of textual material, often interview transcripts, but also for example field notes and free response items in questionnaires (King 2012, p.126). Template analysis involves the construction of a list of codes (a template) which represents themes in the textual data. A code is a label attached to a section of text to relate it to a theme in the data and the codes in the template are usually hierarchically ordered, thus representing relationships between the identified themes.

Characteristic of template analysis is that the outset of the analysis is normally a set of pre-defined, *a priori* codes in the form of an initial template. The development of the initial template can take various forms. The researcher may start out with pre-defined codes based on the theoretical position of the research, he or she may develop the initial template after a preliminary examination of a sub-set of the data or the researcher may take a half-way position, where some codes are defined prior to exploration of the data and these are refined after exploration of the data (Crabtree & Miller 1999, p.167; King 2004, p.259; Waring & Wainwright 2008, p.86).

In the current study, a half-way approach was taken. Thus, after I had read the data closely for familiarization and had checked the interview transcripts for potential transcription errors (King 2012, p.434), two *a priori* codes were defined: 1) Favour towards TCI in the form of MT-assisted TM and 2) disfavour towards TCI in the form of MT-assisted TM. Next, by examining one translator's (Translator A) retrospective interview, sub-codes were added under the *a priori* codes. As recommended by King as a strategy for enhancing the quality of the data analysis (King 1998, p.122; King 2004, p.259; King 2012, p.322), one of my colleagues, another translation scholar, assisted me in this process. She was informed about the research question guiding the analysis as well as about the *a priori* codes, and we then independently coded the interview with Translator A in order to define relevant sub-codes. I conducted the coding using NVivo (QSR International 2017), a piece of software for qualitative data analysis, whereas my colleague conducted the coding manually, i.e. by marking sections of text and assigning them a label. Based on these two independent coding sessions, we compared our codes and discussed similarities and differences between them. This process was productive, since it forced each of us to justify our codes, and it brought new perspectives to the table, which were used to develop the template. Overall, we agreed on distinguishing between attitudes expressed towards TM and MT, respectively, under each of the *a priori* codes. Our discussion revealed minor differences between the specific sub-codes relating to TM or MT, but we easily reached an agreement about the sub-codes to be included. At the end of our discussion, we agreed on an initial template.

The next step in the template analysis process consists in the researcher working through the full set of data, identifying and marking sections of text, which are relevant to the research question (King 2004, p.261). In the course of this, the initial template will often

need revision, for example through the insertion, deletion or merging of codes and the data will typically be reread several times and the template adjusted accordingly. This process will go on until the researcher reaches a point of analytical saturation where all sections of text relevant to the research question have been assigned codes, the analysis stops producing new codes and the template represents the themes in the data (King 1998; King 2004; King 2012; Saldanha & O'Brien 2013, p.192). This final template is then used as the point of departure for producing an account of the data, providing illustrative examples.

Thus, after the development of the initial template in collaboration with my colleague, I continued with the coding of the full set of data (retrospective interviews, field notes and questionnaire answers), also using NVivo. Both in the analysis of the first interview and in the coding of the full set of data, the analysis focused on 1) identifying instances when the translators *explicitly* evaluate TCI in the form of MT-assisted TM with favour or disfavour, i.e. explicitly express their attitudes to the technology and 2) identifying instances when the translators *implicitly* evaluate TCI in the form of MT-assisted TM with favour or disfavour, based on my context knowledge of the experimental setup and of the translators' interaction with the system as observable in the screen recordings. The coding of the full set of data was an iterative process in the sense that the data were read closely multiple times and a number of changes were made to the initial template. For example, for the "MT" code under "Disfavour towards TCI", it became clear that new sub-codes were needed. The retrospective interviews revealed that the translators sometimes evaluated *specific* matches or parts of matches offered by the tool during the translation process with disfavour, i.e. considered them not useful, and that sometimes the translators expressed a more *general* opinion about the lack of usefulness of MT. Thus, two new codes were formed, namely "Specific MT output is not useful" and "MT is generally not useful". Other changes were made as well such as the insertion of new codes and changing the location of codes. To sum up, following the template analysis approach, the data were reread and codes were adjusted until I reached a point of saturation, i.e. a final template which represented the themes in the data. This resulted in the final version of the template shown in Figure 38.

Favour towards TCI in the form of MT-assisted TM	
• TM	<ul style="list-style-type: none"> ○ Concordance search provides adequate translation ○ AutoSuggest is useful
• MT	<ul style="list-style-type: none"> ○ Parts of MT matches or whole MT matches are useful ○ MT is generally useful
Disfavour towards TCI in the form of MT-assisted TM	
• TM	<ul style="list-style-type: none"> ○ The concordance search in the TM is not useful ○ “Trapped” by TM
• MT	<ul style="list-style-type: none"> ○ Specific MT output is not useful <ul style="list-style-type: none"> ▪ Element left out ▪ Untranslatable element translated ▪ Missing formatting / Missing and misplaced tags ▪ Problems caused by integration of the MT engine with the termbase ▪ Incorrect word order in the MT output ○ MT is generally not useful <ul style="list-style-type: none"> ▪ Double-checking MT output ○ MT impacts negatively on cognitive processes <ul style="list-style-type: none"> ▪ “Trapped” by MT

Figure 38. Template analysis: Final template

As described above, the analytical process departed from *a priori* codes and arrived at a final template through an iterative and recursive process “of applying, modifying and re-applying the initial template” (King 2012, p.430). Thus, inspired by Waring and Wainwright, my analytic process was a “deductive leading to an inductive research approach with sub-codes emerging from the data” (2008, p.90). Along the same lines, King states that template analysis “can be positioned in the middle ground between top-down and bottom-up styles of analysis” (2012, p.430) and that it “can be used from varying philosophical positions” (2012, p.429). For my purposes, I found template analysis to be very much in line with the pragmatic worldview of the thesis in the sense that the flexibility and iterative nature of the analytical process is in accordance with the focus in pragmatism on how a research question may be addressed in the most appropriate way.

5.8.1.1 Limitations

The analysis sketched above has some limitations. For instance, TM technology was a totally integrated part of the translators’ daily work processes, whereas they had limited experience with MT (cf. Section 5.1.3). This might have made them more inclined to express their attitudes to MT than to TM. Moreover, although I never specifically stated that I was particularly interested in MT, the translators seemed to expect me to be, since the study was conducted right at the time of MT implementation at TextMinded. This might also have led them to comment more on MT than on TM, and as mentioned in Section 4.3.2.1, it might have led them to tone down their skepticism out of politeness or it might have reinforced negative attitudes. Also, it is generally assumed that people have a tendency to remember

the issues they want to criticize more than those they would like to praise which may have made them more inclined to express disfavour towards TCI than favour.

As explained above, some attitudes to TCI identified in the data relate to specific MT matches or parts of MT matches from the experiment which the translators for different reasons experienced as problematic, whereas others relate to their general attitudes as to whether MT is useful for them as an additional translation aid. Admittedly, this is a somewhat artificial distinction, since the specific experiences in the experiment will probably influence their evaluations of the general usefulness of MT, and conversely their general attitudes to MT will most likely have influenced their specific experiences of the interaction with the tool, as also indicated in the introduction. However, for the sake of the analysis, it was found to be the most appropriate way of distinguishing between the different types of disfavour expressed by the translators in terms of MT.

5.8.1.2 Presentation of results

The presentation of the analysis results will be structured along the themes identified in the data and included in the final template. Themes recurring in at least half of the translators' comments (either in retrospective interviews, field notes or answers in the questionnaire) are explained and illustrated with quotes.⁴⁹ Since the field notes did not contain many examples of the translators expressing their attitudes to TCI and since the length of their answers in the questionnaire was limited, the analysis is primarily illustrated through quotes from the retrospective interviews. When relevant, quotes are supplemented by short descriptions of the translators' processes as observable in the screen recordings.⁵⁰

In the presentation, Kvale and Brinkmann's (2009b, pp.279–281) guidelines for reporting interview quotes are followed. Hence, the quotes are rendered in a "readable written textual form" (Kvale & Brinkmann 2009b, p.280) and a balance between quotes and accompanying interpretative text has been pursued. Thus, for example, repetitions, pauses, "hm"s and the like have been omitted from the quotes. Also, my frequent comments in between, which were only uttered to confirm that I understood what the translator was saying (such as "yes", "no" and "okay") have been omitted. The interviews were conducted in Danish (the translators' first language), but in the following, the quotes are translated into English following a functional approach with the skopos of conveying the semantic meaning of the Danish quotes to the reader. When the translators or I read parts of the English source segments out loud during the interview, this is indicated by quotation marks in the quotes followed by "said in English" in square brackets. When we read parts of Danish matches out loud, BTs into English are provided in quotation marks followed by the italicized Danish expression in square brackets. In text accompanying quotes, generally only the English BTs are used. In quotes, I refer to comments by myself as "R" (for "Researcher").

⁴⁹ Two themes are not addressed in the following, i.e. "AutoSuggest is useful" and "Trapped by TM", since these were only expressed by one and two translators, respectively.

⁵⁰ Since Translator F's screen recording file was deleted after his participation in the experiment, it is not possible to supplement quotes from his retrospective interview with observations from his translation process.

5.8.2 Results

In the following, the results of the investigation of RQ7 are presented. Since, as illustrated by the final template in Figure 38, disfavour was more prominent than favour in the data, and since negative attitudes to TCI are assumed to impact negatively on TCI, the presentation of the findings will focus on the disfavour expressed by the translators. Thus, in this section, the favour expressed by the translators towards TCI is first briefly summarized (Section 5.8.2.1), and in Section 5.8.2.2, the identified themes relating to disfavour explicitly or implicitly expressed by the translators are then presented in more detail. Section 5.8.2.3 presents a synthesis of the translators' answers about the consequences of MT for their future careers as translators. The results are synthesised and discussed in Section 5.8.3.

5.8.2.1 Favour towards TCI

The translators expressed favour towards both TM and MT. As to the expressed favour towards TM, the translators for instance stated at different points during the retrospective interviews that the concordance search function provided them with adequate translations. As to the MT matches provided during the experiment, all translators expressed in the retrospective interviews that parts of MT matches or whole MT matches had been useful. For example, referring to the MT match in segment 24 in the Newsletter, Translator H stated that the MT match was a "flawless sentence in Danish" [*formfuldendt sætning på dansk*]. Referring to the same segment, Translator E stated that the sentence structure in the MT match was actually a more adequate solution than the sentence structure in the source segment, and referring to segment 41 in the FAQ text, she stated that she could almost use the entire MT match. Referring to segment 1 in the Newsletter, Translator A evaluated a part of the MT match with favour when stating that it "sounded pretty well" [*lød meget godt*], although she added afterwards in an ironic tone while laughing that "that was strange" [*det var mærkeligt*], which suggests that she has a general negative attitude to MT and therefore was positively surprised by an adequate solution. However, Translator C generally evaluated the MT matches with favour when stating that the matches she received during the experiment were "surprisingly good" [*overraskende gode*] and that she could use "quite a lot" [*en hel del*]. Translator B mentioned that MT sometimes provides "good suggestions which can be inspiring" [*gode forslag som kan være inspirerende*], and Translator F stated that the MT output can contain "insanely elegant solutions" [*sindssygt elegante løsninger*]. In their comments in the questionnaire about their attitudes to MT, several of the translators also expressed favour towards MT. Translator A mentioned that she hoped to get assignments for which MT could be of help, and Translator E wrote that MT seemed "useful" [*smart*] in certain contexts in terms of the possibility of saving time in the translation process. Translator F made a similar comment, stating that in time MT could provide a good basis for fast editing and an increase in productivity for certain text types. Translator G wrote that MT can be a help and Translator H that her attitude to MT was critical, but also positive. Thus, the translators explicitly expressed favour towards TCI in a number of instances, which shows that the MT-assisted TM tool aided the processes on different occasions and in different respects. It should be noted that the translators may

have implicitly expressed favour towards matches when, for example, accepting matches without edits.

5.8.2.2 Disfavour towards TCI

The translators expressed disfavour towards TCI in different respects: 1) a specific MT output or part of MT output is not useful, 2) MT is generally not useful, 3) MT impacts negatively on cognitive processes and 4) the concordance search in the TM is not useful. These themes are illustrated with quotes in the following.

It should be noted that, since the presentation of the findings also addresses how the translators accommodated resistances posed by the system, the boundaries between favour and disfavour towards TCI may, at times, appear blurred. For example, if a translator expresses disfavour towards MT in a certain respect (e.g. because MT provided an inadequate translation of a term) and then accommodates the resistance offered by the MT system by use of the TM (e.g. by use of the concordance search), this might at the same time constitute favour towards TM. Thus, analysing TCI in the form of MT-assisted TM can be difficult because it deals with an environment in which disfavour towards one technology may be accommodated by another technology. In other words, translators may have complex and sometimes conflicting attitudes to the tool because of the different technologies involved. However, in the following, focus is on the disfavour expressed by translators and it will be addressed when this is accommodated by another technology.

5.8.2.2.1 Specific MT output is not useful

Most of the translators stated in one or more cases during the retrospective interview that a specific MT match or part of an MT match was not useful in the sense that it was not an adequate translation of the source text segment in question. Sometimes the translators just stated that the MT match (or part of it) was not useful and at other times they explained a little more about the reasons why the translation was not adequate.

Translator D, for example, stated when we discussed segment 11 in the Newsletter:

D: I think it was maybe the translation of the lowest quality: "experience the brand acoustic innovations it has never been easier sound front" [opleve den brand akustiske nyskabelser det har aldrig været nemmere lydfrenten]. There is not much else to do than starting over again

Translator D thus evaluated the match with disfavour by stating that the quality of the match was insufficient. In Olohan's (2011) terms, the insufficient quality could be interpreted as resistance posed by the system. The translator did not specify the reasons for this insufficiency, but explained that the match was of no use and that she had to start from scratch. Interestingly, however, as it appeared from the screen recording and the process analysis conducted to address RQ1 and RQ1a (cf. Section 5.2), the translator did not reject the match by deleting it, but revised the match by means of match-internal revision. From a

methodological perspective, it is worth noting here that if the interview data had not been triangulated with the observations in the screen recording, reliance on interview data alone could have led to a misinterpretation of how the translator accommodated this resistance.

When discussing segment 64 in the FAQ, Translator G elaborated on the reasons why parts of a specific MT match were not useful:

G: that is again the machine how it reads this “volume level” [said in English] and then it says “volume strength level” [lydstyrkeniveau], but there I go and look in the memory and say “well, that can be made a little more simple” and I can see that it just says “volume strength” [lydstyrke], so I am thinking that is far better than “volume strength level” [lydstyrkeniveauet], because it is self-evident that it is a level. And then “wait some time” [vent et stykke tid] “wait some time” [said in English] I don’t think that sounds particularly good in Danish so I’m saying “wait a moment” [vent et øjeblik], I think that sounds good in a guide, you don’t have to wait for long, it is just a moment, it might be two minutes, but that you will find out when you are standing there

Here, he pointed out that the Danish translations of “volume level” and “wait some time” were not adequate. The translator explained that the translation of “volume level” was not adequate due to redundancy since the term “volume strength” implies the semantic meaning of “level”. He explained that he searched for the term in the concordance, which is also an example of the TM aiding the translator. In terms of the translation of the phrase “wait some time”, the translator explained that it was not an adequate translation in terms of the communicative situation in which the target text was to be used. According to the translator, the translation of “wait some time” should signal to the target text reader that he or she did not have to wait long, and thus the translator was considering the purpose of the translation in its communicative situation. Consequently, he changed it into “wait a moment”.

A number of other specific reasons for the lack of usefulness of specific (parts of) MT matches recurred in the translators’ comments. These reasons concerned a) that an element had been left out by the MT engine, b) that the MT engine had translated elements which should remain untranslated in the target text (termed “untranslatable elements” in the following), c) that formatting and tags were missing in the MT output and that tags were incorrectly placed, d) that problems were caused by the integration of the MT engine with the termbase, and e) that the word order was incorrect in the MT output. These reasons will be exemplified and commented in the following.

a. Element left out

Half of the translators mentioned in one or more instances that the MT engine had left out elements in the translation. For example, Translator G, referring to segment 15 in the FAQ text, stated that the MT engine had left out the translation of “may”:

G: well I am thinking that, I can see that the machine translation is essentially okay, but for example the word “may” [said in English] has not been included, so it is not given that it is not available, but it can be that it is not, it depends again on the type of equipment one has

The source text segment read “Note that ‘BeoLab 14’ may not be available (...)”, but “may” had not been included in the MT match. The translator explained that “may” needed to be included in the translation since otherwise the meaning of the target-text sentence would be inadequate.

That the MT engine leaves out elements in the output can be seen as an example of resistance offered by the system in the sense that we would expect the MT engine to translate the whole source segment. The translator accommodated this by typing an adequate Danish translation of “may” and translators may generally accommodate such resistances by focusing on discrepancies between the source segment and the match.

b. Untranslatable element translated

Translators A, B, C, D, G and H mentioned on one or more occasions that the red English words, which should remain untranslated in the Danish target text, had been translated into Danish by the MT engine, explicitly or implicitly expressing that this was annoying.

In the observational protocol, I had noted that Translator H seemed annoyed with something at a certain point during the experiment, and when I drew her attention to this during the retrospective interview, she said:

H: then it is simply the thing that it translates things which are not supposed to be translated and I think that you could solve it by, now it is “Technical Sound Guide” [said in English], I think you could solve it if it was included as a term in the term... I don’t know, it depends how it is configured that BeGlobal

Thus, the translator stated that what was annoying was that the MT engine had translated something which was not supposed to be translated, i.e. the term “Technical Sound Guide”. She then presented a potential solution to this challenge, namely to include the term in the termbase, depending on how BeGlobal (the MT system) was configured. During the translation process, as it appears from the screen recording, she solved the problem by copying “Technical Sound Guide” from the source text segment and pasting it into the target segment. This was referred to as the match-external action *pasting element copied from the source segment* in the process analysis in Section 5.2. Thus, in Olohan’s (2011) terms, the system offered resistance in translating something which was not supposed to be translated, and the translator accommodated this by copying the term and inserting it into the target segment. As a potential future way of anticipating such resistances, she presented the solution of including the term in the termbase.

Translator G also mentioned during the interview that “Technical Sound Guide” had been translated. He explained that, instead of having to write “Technical Sound Guide” in the

target segment himself, he accommodated the resistance offered by the system by copying the part of the match which he could use, using the Copy Source to Target function and then pasting the copied text. This was referred to as the *Copy → Copy Source to Target → Insert* action in the process analysis in Section 5.2. The process analysis showed that Translator G was one of the translators, who often used this match-external action, among others in segments, which contained elements, which should remain untranslated in the target text, and who seemed to have this as an iterative operation pattern when encountering such resistances.

c. Missing formatting / Missing and misplaced tags

The translators also explicitly or implicitly expressed disfavour towards the MT system in terms of source-text formatting which had not been transferred to the MT match and in terms of tags which had either not been transferred to the MT match or were not placed correctly in the MT match. This theme was only identified in the parts of the interviews which regarded the FAQ text, since the Newsletter contained no formatting or tags.

As regards tags, Translator A stated when referring to segment 3 in the FAQ text:

A: well I thought it was annoying that it translated "MODE" [said in English] when it wasn't supposed to be translated, but I know that's the way it is, but also that it is not placed correctly in the sentence, that is that it is not placed inside those tags

The translator thus expressed disfavour towards the MT system, not only because it had translated "MODE" into "TILSTAND" although it was not supposed to be translated (similarly to the examples above), but also because "TILSTAND" was not placed inside the correct tags in the MT match. She accommodated this resistance by copying "[tag] MODE [tag]" in the source segment and pasting it into the target segment as could be observed in the screen recording.

When asked about segment 39 in the FAQ text, Translator C stated:

C: I of course have to keep track of all those tags in there, it is a bit confusing so ... and I get them placed. So sometimes I simply just took in the source segment to be sure that all tags were included, so you don't miss anything. It is easier than having to copy and paste them, it is a bit faster I think.

R: okay, so there you have to move "AMP" [said in English] into

C: yes that is what I have to do, into the last one there and "line" [said in English] has to be written in capitals. So that's what's going on there

R: so that's the primary thing about that segment

C: yes, it is, to ensure that all tags are included and that the red text is placed inside the tags

In the source segment in segment 39, there were tags around four words written in red, namely "BeoLab 14", "MODE", "LINE" and "AMP". In the MT match provided, the translations of "BeoLab 14" and "LINE" had been placed inside the tags, but the translations of "MODE" and "AMP" had not. Translator C explained that sometimes she uses the Copy

Source to Target function to make sure that all tags are included in the translation and are placed correctly, since this is easier than copying single tags from the source and pasting them into the target segment. However, in this case she chose to write “MODE” and “AMP” inside the tags herself. Thus, the resistance offered by the system in terms of the tags was here accommodated by the translator writing the translations inside the correct tags herself, and she presented the use of the Copy Source to Target function as another typical way of accommodating such resistances. As was evident from the process analysis in Section 5.2, by some of the translators, the Copy Source to Target function was frequently used to accommodate resistances in terms of missing formatting and tags.

Translator D also explicitly expressed frustration with tags and explained that when the tags are not placed correctly in the match, she has to either copy single tags to the target segment or she has to use the Copy Source to Target function and write her translation in between the tags. According to her, in either solution, the tags get in the way. However, indicating that tags interrupt her natural segmentation, she explained that copying the source to the target segment gives a better flow than copying the tags to the target segment one by one. From the perspective of TPR and TCI, it is interesting to observe that often the translators would actually rather delete the MT match by replacing it with the source segment in order to have the correct tags than they would copy the tags one by one from the source segment and keep the match in the target segment.

d. Problems caused by integration of the MT engine with the termbase

In one or more cases, all translators besides Translator F mentioned problems in the matches which seemed to be caused by the integration with the termbase, which was set to overrule the output of the MT engine.

Referring to segment 39 in the FAQ text, Translator D said:

D: something goes wrong with this “switch” [said in English] as verb which turns into “switch” [omskifter], which maybe comes from the termbase, I guess it does actually if what is in the termbase overrides the machine translation so to speak, which I think is part of the set-up. At least we have been asked as translators that everything which is in the termbase should take precedence over what just comes out as output of an engine

The source text in segment 39 read “Why does my BeoLab 14 not switch to standby (...)”, but in the MT match, the verb “switch” was translated into the Danish noun “switch” [omskifter]. Translator D explained that the integration of the MT engine with the termbase probably caused this inadequate translation (the termbase contained the English noun “switch” with the Danish noun “omskifter” as its translation), adding that the translators are to give priority to terms included in the termbase. The translator accommodated the resistance offered by the system by writing “switches” [skifter] instead of “switch” [omskifter].

e. Incorrect word order in the MT output

In six of the interviews, the translators mentioned in one or more instances that the word order was incorrect in the MT output. In the observational protocol, I had noted that around the time when Translator H was translating segment 11 in the Newsletter, she said out loud that “this is such a good sentence for critics of MT” [*det er sådan en god sætning for kritikere af MT, det her*].⁵¹ I mentioned this to her in the interview and she explained:

H: yes yes, that was really bad, it is really a good example of how it works when it works the least, machine translation, that it just takes the words one by one and joins them no matter if they fit together or not, and depending on the type of text then you can encounter such segments or pretranslations to a greater or smaller extent, and we like to laugh a bit about segments like these, but that sentence I could not use for a lot

The translator explained that the match was of a very low quality because the MT engine had just taken the words in the source segment and translated them one by one, resulting in a sentence which was unidiomatic Danish, since word-for-word translation was not appropriate in this situation. It appears from my field notes that during lunch after Translator H had participated in the experiment, she told a colleague, a project manager, who asked her about the experiment that “MT is what it is, but it was nice to be able to express one’s candid opinion” [*maskinoversættelse jo er, som det er, men at det er rart at få lov at ytre sin uforbeholdne mening*]. This suggests that Translator H had a negative general attitude to MT, although I did not get the impression from the interview that she was particularly critical.

5.8.2.2.2 MT is generally not useful

The translators made several comments about the general lack of usefulness of MT. For example, in the general part of the retrospective interview, when I asked him whether he felt that any external factors influence him when he translates, Translator B said:

B: no I don’t think so, I think it is a combination of experience and then, well just the approach we take to it that many of our clients expect a little more than they did 5 to 10 years ago. So it is often something about finding a synonym to the first, to the obvious choice of term, right? It is a small trick

R: to make it more creative or?

B: well simply to show that you are not just a dictionary or that you don’t just choose the first, the most obvious expression. We experience it in particular when we translate into English that many clients they think it seems translated if you choose a perfectly usable expression, but if it was also the first word in the dictionary. Well, if you translate “platform” [said in English] to “platform”, then someone will think “argh ... couldn’t it be called something else”, so it is simply such a, it is almost a kind of hedging. That we know that with some clients if we can find an alternative then we don’t get that comment about “isn’t it a little Denglish” [negative word implying that the Danish translation is too strongly

⁵¹ Translator H’s process when editing segment 11 in the Newsletter was exemplified in one of the process examples in Section 5.2 (example 19-NL-H-11).

influenced by English]. So it is always at the back of my head and I will say it actually conflicts a little with the idea of machine translation, because there is nothing wrong with choosing the word “platform”, but well we just know that with some clients it is just an advantage to choose an alternative, so it is a strange balance and it definitely plays a role. It is always at the back of my head when I translate, to find something which is just a little different and also sometimes to merge segments or split them or change a bit in the punctuation, that is also a small trick and sometimes it is also necessary linguistically

Translator B explained that in order to live up to the clients’ expectations, he makes translation choices which make the translation seem less like a translation. For example, on the word level, he tries to come up with translations which are not the most obvious choices. Further, he explained that clients might criticize perfectly adequate Danish translations, just because the text still looks English, and that he is anticipating this type of criticism by coming up with creative solutions which demonstrate his competence as a translator. Interestingly, he also sometimes accomplishes this by merging or splitting segments or changing the punctuation. According to Translator B, this impacts a great deal on his translation process. His reflections suggest that he thinks machine-translated texts are typically very close to the sources, and his wish to deviate from the most obvious choices is thus in conflict with the notion of MT, making MT less useful. Along the same lines, he stated later in the interview that MT might be useful for assignments which do not have to be “super great” [*superlækre*]. However, he then went on to say that he did not think many of their clients would settle for less than the highest quality, thus expressing a lack of usefulness of MT for TextMinded’s purposes.

Translator D stated something similar when stressing that translations should not appear to be translations, and that TextMinded simply cannot afford to deliver translations which as much as resemble something which has been machine translated. This also suggests that basically she expects MT to produce poor quality translations, and that there is a long way to go from the MT output to a quality which satisfies the clients’ expectations, thus also indicating a lack of usefulness of MT for TextMinded’s purposes. At another point in the interview, Translator D explicitly stated that MT was not yet entirely good enough for TextMinded’s purposes.

Another way in which the translators explicitly or implicitly expressed a general lack of usefulness of MT was by double-checking the MT output, typically against the TM by using the concordance search. Some of the translators explicitly stated that they did not trust the MT output and therefore double-checked the translations provided by MT. For instance, Translator A stated that the terminology was generally not correct in the MT output and therefore she wanted to double-check it against the TM. Other translators implicitly expressed a lack of usefulness of MT when explaining that they wanted to be sure that the MT suggestion was acceptable and therefore double-checked it. These are instances where the disfavour towards MT expressed by the translators seems to at the same time constitute favour towards TM, since the translators turn to the TM to accommodate the resistance offered by the MT engine.

5.8.2.2.3 MT impacts negatively on cognitive processes

Several of the translators mentioned during the interview that the cognitive processes involved in editing MT matches differ from the processes involved in traditional translation and in working with TM matches in a negative way. In TPR research it is often argued that CAT tools impact on translators' mental processes (Christensen 2011), and it was thus interesting to note that the translators themselves are conscious about ways in which the integration of MT changes their cognitive processes.

Translator D was quite explicit in her explanation of the differences between her usual translation process and editing MT matches:

D: normally when you start translating and read a segment, then you are already formulating something in your head. Actually you have to refrain from doing that, now you actually have to refrain from doing that. Now you have to read the source text and then you have to read what comes out of the machine translation, then you have to somehow determine how much of it you can use, right? It actually requires that you might still have your own sentence in your head, but it turns into such a comparative exercise for every single segment instead of a flow, right?

Translator D thus explained that the integration of MT changes her cognitive processes and that the translation process turns into an exercise of comparing her own mental translations of segments to the MT output. As mentioned in Sections 4.3.1.1.1 and 5.1.1, during my first visit to TextMinded, I attended a webinar on MT together with the translators. Interestingly, as it appears from my field notes, Translator D already during the webinar described the difference between working with MT and her usual translation process in this way. In fact, she stated that when working with MT, she had to “turn off the creative process” [*slå den kreative proces fra*]. She added that, after the integration of MT, at least in the beginning, she might find it easier to delete the MT match and translate the source segment from scratch. However, as it appeared from the process analysis in Section 5.2, Translator D never deleted a match and translated from scratch; instead, when rejecting a match, she used the Copy Source to Target function. During the webinar, Translator D also stated that translation might become more like reviewing other translators' translations.

In the translators' answers in the post-experimental questionnaire about their attitudes to MT, Translators A, C and F also expressed in different ways that MT changes the translation process. Translator A stated that in the cases where she had used MT, the translation process was prolonged because she starts out trying to use and improving the MT output, but often ends up realizing that it is not of any use. Translator C stated that editing MT matches is another way of working, which requires adjustment, and Translator F stated that translating with MT is a different process, because he has to evaluate the MT match before he can proceed and choose the final solution.

“Trapped” by MT

Six translators expressed that they sometimes feel “trapped” by MT matches. They used expressions such as being “led astray” [*ledt på afveje* and *forledt*] (Translators A, C and H),

being “restrained” [*bundet*] (Translator F), and “falling through” [*falde igennem*] (Translator D) when working with MT. Translator G mentioned that words in the MT output might seem “harmless” [*tilforladelige*], but are not. In the translators’ answers to the question in the questionnaire concerning their attitudes to MT, the feeling of being trapped was similarly expressed: Translator C talked about “freeing” [*frigøre*] oneself from the MT output, Translator G about being “led astray” [*forledt*], and Translator H said that MT entails certain “pitfalls” [*faldgruber*]. Thus, MT was described as something which can deceive translators, suggesting a general suspicion of MT.

Translator F stated that he did not like to have segments pretranslated, because it changes his translation process, since he has to relate to the MT output right away. He continued to say that it also depends on the text and the MT engine, adding that the engine used for translating this text was not that good. He went on:

F: but this is not good, because you are coloured right away. My normal process, let's say if I get a clean document, it is simply that I have copied everything and then I start writing on top of that, that is how my translator brain works the best, because before I start writing I have reached the solution in my head already – right? – and that is how it works for many in here I think

R: and do you then with MT, you become, well

F: yes I am restrained

R: instead of starting that process

F: yes yes

R: then you become

F: yes yes

R: forced to relate to

F: yes that's clear yes, yes but at the same time there can be some insanely elegant solutions in the previous, in what is the basis for the machine translated so to speak which I had not thought of myself. Well, it is a little fifty-fifty – right? – but I also think it is a process of adjustment, because it is simply a way of unlearning how you translated earlier

Here, Translator F explained that usually, when no matches are found in the TM, he would copy the source text to the target text and then he would write on top of the source text, explaining that this is his optimal translation process. Similarly to Translator D above, he said that before he starts typing his translation, he has already reached a solution in his head, but when working with MT, this is “overruled” by the MT output. Translator F added that the MT output might contain extremely adequate solutions which he had not thought of himself, stating that it is a learning process and that it is about “unlearning” the way you have translated before MT was integrated with the TM tool. This is interesting from a TPR perspective, since this suggests that MT matches are not just providing the translators with translation suggestions they would not have had in a traditional TM environment, but that the integration of MT changes the translation process.

Translator G also expressed a feeling of being trapped by the MT output when stating that what makes working with MT difficult is to judge whether a provided match is an adequate translation, because even if something has been left out compared to the source segment,

the match can read like an adequate translation. Furthermore, deciding on how much of a provided match must be edited is problematic because no match percentages are provided, i.e. no metadata, as in TM matches. He went on:

*G: well in some cases you can use it and it saves you time and in other cases it is actually confusing, you think it is rubbish and I would actually have been better off just thinking this sentence from the beginning, because now I have been trapped by this and this word which I feel obliged to use and it can be difficult to set this aside and say it is **me** who makes this translation, it is me who decides what to write*

To sum up, the translator expressed a feeling of being trapped by the output and explained that it can be difficult to take control and not let the system “decide” what the translation should be. Here, we have an example of the “dance of agency” as described by Olohan (2011), namely that the translator and the technology interact in a process of resistance and accommodation where the translator tries to stay in control of the interaction. The translator further explained that the reason for his feeling trapped was also that he did not know the origin of the MT matches, i.e. whether the MT engine drew on material from the Internet, from which he was allowed to deviate, or whether it drew on material from the client in question, which he should accept, in accordance with a general norm of giving priority to client preferences. Thus, it seems that the translator had a feeling of MT as a “black box”, i.e. that he did not understand why something was translated in a particular way (see also Bundgaard et al. 2016).

5.8.2.2.4 Concordance search in the TM is not useful

The translators only mentioned one negative issue related to TM, namely that sometimes concordance searches do not provide solutions to a specific translation problem. When commenting on segment 11 in the Newsletter, Translator C stated that the concordance did not provide her with a translation of the term “compelling”:

*R: then you search for the part over there “accessible...” [said in English]
C: yes I thought that there might be (laughs) help to get for that “compelling” [said in English], but there wasn’t, so I had to go find a solution myself*

Translator H made a similar comment in relation to segments 23-25 in the FAQ text⁵²:

H: that is where I encounter that “bass position knob” [said in English] for the first time and I cannot find that in the concordance and then I run some Google searches on what the translation may be and I search in dictionaries as well

Both comments suggest that the concordance search is used as the first resource when the translators encounter a translation problem and need to carry out research in order to find the solution. When the concordance search is not successful, the translators turn to other

⁵² Translator H’s process when editing segment 23-25 in the FAQ text was exemplified in one of the process examples in Section 5.2 (example 22-FAQ-H-23-25).

sources: Translator C comes up with a solution herself, and Translator H searches Google and some dictionaries.

5.8.2.3 The future

The future of the translation profession is something which certainly concerns the research community and translators themselves. In the CAT literature, the question of how translation technology is going to change professional translators' job descriptions in the future is often asked, but rarely answered. As pointed out by Schmitt, conflicting perceptions of the future of MT exist: "Either it is assumed that the MT can never be as good as a human translation or machine translation is viewed as the ultimate enemy of the translator and as a job killer" (Schmitt 2015, p.234; see also O'Brien 2012, p.119). In the post-experimental questionnaire the translators were asked what they expected that the use of MT would mean for their jobs as translators in the future (question 17). In the following, their answers are summarized.

Many of the translators mentioned that they expected to become "post-editors" [*post-editorer*] (Translators B, C and G), "reviewers" [*korrekturlæsere*] (Translator G) or "editors" [*redaktører/editors*] (Translator F) in the future. Translator A mentioned that if the quality of MT output increases, she expects to get a more "text editing" [*tekstredigerende*] function, and Translator E stated that she expected that the translation process would come to contain an element of "review" [*korrekturfase*]. Translator D answered that she hoped that MT is going to ease translation in the future, but that her impression was that translation has already become "high-level text production" [*tekstproduktion på højt plan*] to the extent that many processes cannot be taken over by machines, probably meaning that MT cannot produce translations of a quality which is comparable to what a translator can produce. Translator H stated that she expected the editing of MT output to fill up a large part of her working day and that all the texts which she translates will be machine translated in the future. Translator A added that if the quality of MT does not increase, she considered it to be more of an obstacle than a help, and Translator B added that "some (creative) texts" [*nogle (kreative) tekster*] would still require a considerable human effort. Translator C stated that she did not hope it to hold true that, in the near future, translators would never have to translate segments from scratch, but also wrote that translators would probably turn into post-editors. Finally, she wrote "unfortunately, because it is translating which is fun" [*desværre, for det er oversættelse, der er sjovt*].

5.8.3 Synthesis and discussion

Taking as a starting point that translator attitudes to TCI can impact on their interaction with the technology, the translators' evaluations of the attitude object of TCI in the form of MT-assisted TM were analysed, applying template analysis. In favour of TM, many translators stated that the TM aided the translation process since the concordance search function in the tool provided them with adequate translations. This confirms findings in the studies by O'Brien and Moorkens and LeBlanc, who found that translators find the concordance particularly helpful (O'Brien & Moorkens 2014, p.134) and that the concordance is

considered a “one-stop shop” (LeBlanc 2013, p.6) replacing other sources of information. In terms of favour towards MT, in the current study, all translators expressed in one or more instances that the MT engine had provided adequate translations of particular (parts of) source segments, and several translators also stated that generally MT can provide translations of a good quality. Thus, the MT system was to some extent perceived as an aid in the translation process.

The presentation of the findings focused primarily on the disfavour expressed by the translators towards TCI, since the analysis revealed that disfavour was more prominent than favour in the data and since negative attitudes to TCI are assumed to impact negatively on TCI. The disfavour expressed revolved around the lack of usefulness of MT, both in terms of specific (parts of) MT matches in the experiment and in general, around negative impact of MT on translators’ cognitive processes and around the concordance search function in the TM not being useful on some occasions. Regarding specific MT matches, translators expressed that it is problematic that elements are left out by the MT engine and that elements which were not meant to be translated were translated by the MT engine. In Olohan’s (2011) terms, such instances are examples of resistances offered by the system, which the translators accommodated by, for example, copying elements from the source segment and pasting them into the target segment or by using the Copy Source to Target function. These ways of accommodating resistances were also identified as match-external actions in the process analysis in Section 5.2. One of the translators also suggested that elements which should not be translated could be included as terms in the termbase as a potential future way of anticipating such resistances. The translators also expressed disfavour towards the MT-assisted TM tool in terms of source-text formatting and tags which had not been transferred to the MT match and tags which were not placed correctly in the MT match. The translators for example accommodated such resistances by copying tags from the source to the target segment or by using the Copy Source to Target function as also identified in the process analysis. Interestingly, Guerbero Arenas also observed that tags constitute a problematic issue and notes that “translators often complain that with a heavily tagged document it is easier to work from the source text and not from a proposed text where tags need to be rearranged completely in each segment” (2013, p.86). O’Brien and Moorkens (2014, p.135) also indicated that tags constitute a typical problematic issue when working with MT. Moreover, in the current study, several translators highlighted instances where the integration with the termbase seemed to have caused problems in the MT output, and many translators noted that often the word order was incorrect in the MT output.

Another type of comments concerned a general lack of usefulness of MT. These comments suggested that translators think that MT output is typically too close to the source text and that there is a long way to go from the MT output to a quality which lives up to the clients’ expectations, indicating a lack of usefulness of MT for TextMinded’s purposes. Guerbero Arenas (2013, p.86) observed something similar when a translator stated that MT was more beneficial to him financially if the quality requested by the client was just “understandable” and the target text was not highly visible, whereas he found that it became unprofitable if the quality was expected to be very high. In the current study, another way in which the

translators explicitly or implicitly expressed a general lack of usefulness of MT was by double-checking the MT output, typically against the TM by means of the concordance search.

Interestingly, one of the translators also argued that the notion of MT conflicts with his wish to make the translation seem less like a translation in order to avoid criticism from clients. He accomplishes this by making translation choices on the terminological level which deviate from the most obvious choices and by merging or splitting segments or changing the punctuation. That the translator deviates from the structure and punctuation of the source text in order to demonstrate his competence as a translator is highly interesting in the context of some of the aspects of TM often problematised, namely that a monotonic mindset is imposed on translators and that it makes translators feel that they should stay close to the structure of the source text (Bowker & Fisher 2010; Melby et al. 2015, cf. also Section 2.3). LeBlanc (2013), for example, reported that the interviewed translators in his study found that combining and splitting segments becomes more complicated in a TM environment.

From a TPR perspective, it was noteworthy that many translators reflected on the ways in which MT impacts negatively on their cognitive processes. Some expressed that MT disturbed their translation processes, because, whereas they usually read the source text segment and then translate it, with MT, they also have to evaluate the MT match. O'Brien and Moorkens (2014, pp.132–133) argue that this change in the translation process might explain why translators perceive post-editing to be more cognitively demanding than traditional translation.

Many translators also expressed a feeling of being trapped by the MT output, because it may seem harmless, but, in fact, is not. Christensen and Schjoldager found something similar in their study, although in the context of TM, when a student-translator expressed that “when your eyes have first registered a translation proposal, it’s harder to think of other solutions” (2011, p.125). This feeling of being trapped might, at least partly, have been caused by the translators’ lack of knowledge of the origin of the MT matches, suggesting that MT seems to be a “black box” for translators. This “black box perception” was also found by Karamanis et al. (2010), who stated that:

“[a]lthough the specialised researchers who developed an MT engine are probably able to tell why a certain string has been translated in a particular way, for most people who are not working in this domain the MT engine remains a black box” (Karamanis et al. 2010, p.251; cf. also Karamanis et al. 2011, pp.45–46).

They suggest better information to translators about the origins of the output as one means of improving the integration of MT and TM, which was also one of the conclusions in Bundgaard et al. (2016). O'Brien and Moorkens (2014) also identified such metadata as important to translators.

The only recurring theme encompassing disfavour towards TM covered instances when translators stated that they turned to the concordance search for help, but the search did not provide any. That the translators did not make many negative comments about TM (or positive, for that matter) may indicate that TM was a completely integrated part of their processes, a sort of “business as usual”, which the translators typically did not question. This is in line with the observation by LeBlanc, who states that TMs “are completely integrated in the translators’ workstations and their use is not optional” (2013, p.5). However, when seen in light of the studies of Moorkens and O’Brien (2013) and O’Brien and Moorkens (2014) who found a high level of dissatisfaction with TM tools, this was a bit surprising. As pointed out by Christensen and Schjoldager, a reason might also be that experienced TM translators are no longer “conscious of any changes that the technology may have caused to their mental processes” (2011, p.122). However, as explained above, the translators did seem to reflect on the impact of the technology on their processes.

In conclusion, although the translators put forward many negative aspects of TCI and MT in particular, they also acknowledged positive aspects of MT-assisted TM. Also, they expected MT to play a large role in their future working lives. Generally, the translators seemed to have a flexible and pragmatic attitude to TCI, adapting to the tool’s imperfections and accommodating its resistances as well as offering solutions to how resistances could be anticipated in the future. The study also showed that translators were critical of how the technology impacts on their cognitive processes and expressed a wish to remain in control of the translation process. As Translator F stated: “in the old days, when we didn’t have translation memories, the process was easier because you could control the text, now the text controls you, right?”.

Chapter 6

Discussion and conclusion

Chapter 6. Discussion and conclusion

This thesis set out to explore how translators interact with an MT-assisted TM tool and what their attitudes are to this interaction, employing a mixed methods methodology. In this chapter, a condensed reading of the thesis synthesizes the findings. Next, a number of aspects related to the understanding of TCI in the form of MT-assisted TM translation, which the analyses have given rise to, are reflected upon. Then, the study's contributions and limitations are discussed, and a brief update on TextMinded's use of MT-assisted TM is given, before possible avenues for further research are suggested.

6.1 A condensed reading of the thesis

After introducing MT-assisted TM translation in Chapter 2, Chapter 3 situated the thesis within the disciplinary context of TS and the subfield of TPR. After providing an overview of different definitions of the translation process and after introducing the field of HCI, I argued that MT-assisted TM translation is a context-dependent TCI process. Following a description of methods typically applied in TPR, and taking the aim and research questions as well as the theoretical standpoint of the thesis as my point of departure, a literature review was undertaken which was concerned with studies investigating TCI as a context-dependent activity and with experimental studies investigating MT-assisted TM translation. Based on this literature review, a number of research gaps were identified. These included lack of research into translators' interaction with an MT-assisted TM tool, e.g. in terms of their choices to accept, reject or revise the proposed matches and in terms of their interaction with the tool in relation to these choices; a lack of research into self-revision and review in an MT-assisted TM context; a lack of research dealing with Danish or even Scandinavian languages in a MT-assisted TM context; and a lack of studies of MT-assisted TM that took context into account and which let translators work in their typical ways and with familiar tools. Against this backdrop, a workplace study was conducted at the Danish LSP TextMinded, described in Chapter 4. The study was guided by the worldview of pragmatism, designed as an embedded mixed methods study, and included a contextual study and an experimental study. In the contextual study, the methods of observation, semi-structured interviews and document collection were used to study, among other aspects, the use of CAT tools, including the implementation of MT, and the workflow at TextMinded. The experimental study consisted of an MT-assisted TM translation part and a review part. In the MT-assisted TM translation part, eight translators at TextMinded each translated two texts by means of MT-assisted TM translation; it used the methods of screen recording, keystroke logging, observation, retrospective interview and a post-experimental questionnaire. In the review part, the eight translators each reviewed one of their colleagues' translations and self-reported the time spent on the task. Then, in Chapter 5, after a contextualisation which introduced TextMinded's considerations regarding the implementation of MT, the workflow context at TextMinded and individual differences between the participating translators, the research questions of the thesis were analyzed. The key findings are summarized in the following.

6.1.1 Overall synthesis of the findings

In what follows, the answers to each of the research questions are recapitulated in the form of key findings.

RQ1: To what extent do the translators accept, reject and revise TM and MT matches?

The analysis of RQ1 showed that, in the FAQ text, CM matches and 100% matches were mostly accepted, and 95-99% matches were mostly revised or accepted. 85-94% matches were mostly rejected or revised. 75-84%, 70-74% and MT matches were mostly revised. Of the MT matches, 9% were accepted which is interesting from a productivity perspective, since these were instances where the MT engine produced suggestions that were acceptable to the translators without changes. The analysis also showed that 29% of the 70-74% matches were rejected compared to 12% of the MT matches, indicating that it might be preferable to set the TM/MT threshold higher than 70%. In the Newsletter, 100% matches were mostly accepted, and 95-99%, 85-94%, 75-84%, 70-74% and MT matches were mostly revised. Very few matches were rejected in the Newsletter (6% of 75-84% matches and 2% of MT matches), and 4% of MT matches were accepted without changes. Regarding the TM/MT threshold, analysis of the Newsletter did not indicate that it should be set higher than 70% since there were only small differences between the translators' choices in MT and 70-74% matches, indicating that these match types are comparable. When comparing the results from the two texts, we saw that 100% matches are mostly accepted, and that TM fuzzy matches (with one exception) and MT matches are mostly revised. Whereas all TM fuzzy match types and MT matches were sometimes rejected in the FAQ text, only 75-84% and MT matches were rejected in the Newsletter and only on a few occasions.

RQ1a: How do the translators interact with the MT-assisted TM tool when they accept, reject and revise matches?

RQ1a aimed at identifying characteristics of the translators' interaction with the tool in the accept, reject and revise categories and at providing illustrative examples of the interaction. Concerning the accept category, analysis of both the FAQ text and the Newsletter showed that the translators typically accepted the matches without conducting any research to verify the proposed translation suggestion. The accepted matches had different characteristics; for instance, some were fully adequate translations of the source-text segments (some of which were condensed translations), some contained what the translators appear to have deemed insignificant differences compared to the source-text segments and some were adequate direct transfers of source-text segments. Some were also accepted although they did not appear to be entirely acceptable translations.

Concerning the reject category, it was interesting that none of the translators rejected any matches by use of "pure" deletion, i.e. by using the keyboard or the mouse to delete the suggestion. This went against the typical assumption in the CAT literature that if translators reject matches, they translate the source segment from scratch. Instead, this study has shown that the translators replace the match with the source segment or, in a few cases where TM matches had been pre-inserted, with an MT match. Further, it was interesting

that certain elements such as source-text items which can be directly transferred to the translation, formatting and tags seemed to trigger the rejection of matches using the Copy Source to Target function.

Concerning the revise category, it was determined for all matches whether the translators used match-internal or match-external revision. In the FAQ text, analysis showed that, when editing TM matches with match values from 75% and up, translators relied primarily on their own judgement in the sense that they did not use any resources or functionalities external to the match, whereas in 70-74% matches and MT matches they needed other support than the proposed matches. In the Newsletter, analysis revealed that translators relied on their own judgement in all types of TM matches and that in MT matches, they mostly made use of resources or functionalities external to the match. With regard to the TM/MT threshold, it was interesting to note that in the FAQ text, match-external support was sought in 93% of the revised 70-74% matches compared to 62% of revised MT matches. It was suggested that, if the extent of the translators needing match-external revision is an indication of the quality of the matches and the higher percentage of match-external revision in 70-74% matches was thus an indication that the quality of these matches was lower than the quality of the MT matches, this supported the tentative suggestion from the investigation of RQ1 that for this text, it might be advisable to set the threshold higher than 70%. However, it was also pointed out that this needed to be considered in the light of data on, for instance, editing speed in these match types. In the Newsletter, there was no indication that the threshold should be set higher than 70%.

Further exploration of the matches categorized as instances of match-internal revision showed that AutoSuggest suggestions were seldom employed by the translators. Analysis of the matches categorized as instances of match-external revision showed that the translators used a number of different match-external actions. For example, analysis showed that in the FAQ text, the *concordance search* and the *Copy/Cut → Copy Source to Target → Insert* action were most frequently used, and in the Newsletter, the *concordance search* and the *Google search* action were most frequently used. In both texts, a wider range of external actions was used in MT matches than in the other match types. In both texts, the concordance search was the only external action used by all translators, and for most of the translators, it was the action most frequently used. Thus, it was suggested that the concordance search was the preferred external action for translators. Interestingly, in the FAQ text, analysis showed that for some of the translators, certain elements (words that could be transferred directly to the target text and tags indicating the presence of a visual element) seemed to trigger the use of *Copy/Cut → Copy Source to Target → Insert* action. Therefore, I suggested that this action was an example of an iterative operation pattern. The Newsletter did not contain any formatting or tags, and the *Copy/Cut → Copy Source to Target → Insert* action was only used once in this text. This was taken to support the suggestion that certain elements trigger this action. The analysis of match-external revision also showed that only in a few cases when translators searched online did they go beyond Google in the sense that they visited a Web page coming up as the result of such a search.

In the process examples, by juxtaposing the process analysis with the retrospective interviews, it was possible to follow the unfolding of the translation process; having translators' thoughts about their processes enhanced the understanding of these processes. For example, some process examples suggested that translators tried to avoid unnecessary typing, and others illustrated how translators dealt with what they seemed to experience as translation problems by using different match-external resources to reach a terminological decision. Also, in some examples, the translators argued for their translation choices by referring to the target text context.

RQ2: How much time do the translators spend on editing TM and MT matches, respectively?

Analysis of RQ2 showed that, in the FAQ text, the translators spent less time on average and measured in words per minute editing 100%, 95-99%, 85-94% and 75-84% matches than they did editing MT matches. The average editing speeds for 70-74% and MT matches were similar, with a slightly higher speed for MT matches. On the individual level, three translators edited MT matches slightly faster than they edited 70-74% matches, and four edited 70-74% matches slightly faster than MT matches. In the Newsletter, analysis showed that the translators spent more time on average editing MT matches than any TM match type. With one exception, this also held true for the individual translators. In the FAQ text, results supported the suggestion proposed on the basis of the investigation of RQ1 and RQ1a that it might be preferable to set the TM/MT threshold higher than 70%, and in the Newsletter, the results also supported the results of the analysis that addressed RQ1 and RQ1a which did not indicate that the threshold should be set higher than 70%.

RQ3: Do the translators edit the matches in a linear or non-linear manner?

The analysis conducted to answer RQ3 showed that none of the translation processes was linear since all translators revisited a previous segment at least once. The revisits seem to be motivated by the translators wanting to ensure terminological or phraseological consistency.

RQ4: Do the translators check their translations and if so, are changes implemented in this phase essential or preferential?

The analysis addressing RQ4 showed that six out of seven translators checked both of their translations in a final phase of the translation process. Furthermore, analysis showed that in the FAQ text, the translators spent between 0 and 20% of the total time spent on the editing and checking phases on checking their translations, and in the Newsletter, they spent between 0 and 36.9% of the time on checking their translations. As regards the type of changes implemented, analysis showed that 56.8% of the changes in the FAQ text and 34.4% of the changes in the Newsletter were essential. In the FAQ text, all translators made at least one essential change during the checking phase, and in the Newsletter, all translators apart from one made at least one essential change when checking the translation. Thus, the analysis that addressed RQ4 showed that most of the translators prefer checking their translations, suggesting that a checking phase is still necessary.

RQ5: How much do the translators modify TM and MT matches, respectively?

Next, the amount of editing performed by the translators in the different match types was investigated. This was accomplished by means of the HTER metric that measures the edit distance between the proposed matches and the final translations. The analysis showed that in both texts, on average, the translators edited less in MT matches than in 70-74% and 75-84% matches, and in the FAQ text less than in 85-94% matches. Thus, conversely, in the FAQ text, the translators edited more in MT matches than in 95-99%, 100% and CM matches, and in the Newsletter, they edited more in MT matches than in 85-94%, 95-99% and 100% matches. The analysis also highlighted that in some cases the HTER method does not reflect the actual technical effort exerted by the translators, such as when they ensure that the target text contains the same tags as the source text since the HTER method cannot take changes in tags into account. The HTER scores were related to the analysis of editing speed (RQ2) and here we saw that although the translators spent a similar amount of time or more time editing MT matches than editing TM matches, they ended up editing less in MT matches than in a number of the TM match types. This indicates that the translators spent relatively more time considering and/or implementing the necessary edits in MT matches than in TM matches.

RQ6: How much time do the translators spend on reviewing their colleagues' translations and are changes implemented in this phase essential or preferential?

RQ6 explored the review phase of the experimental study by investigating the time the reviewers spent on reviewing their colleagues' translations and whether changes implemented were essential or preferential. The analysis showed that the reviewers differed rather substantially in the amount of time they spent on review and that all reviewers implemented changes in the text they were assigned. In the FAQ text, all reviewers implemented essential changes, and in the Newsletter, all translators apart from one implemented essential changes. This indicates that review is a necessary part of the MT-assisted TM translation process.

RQ7: What are the translators' attitudes to TCI in the form of MT-assisted TM translation?

Finally, RQ7 explored the translators' attitudes to TCI in the form of MT-assisted TM by analyzing the retrospective interviews, field notes and parts of the post-experimental questionnaire using a template analysis approach. In doing so, the analysis focused on how translators accommodated resistances offered by the MT-assisted TM tool. The findings showed that the translators identified many negative aspects of MT, e.g. in relation to specific problems in the MT output. Translators expressed that it is problematic that elements are left out by the MT engine, that the MT translates elements which are not meant to be translated and that source-text formatting and tags are not transferred correctly to the provided match. Also, several translators highlighted instances where the integration of the MT engine with the termbase seemed to have caused problems. Further, many translators reflected on a negative impact of MT on their cognitive processes and

expressed the view that they felt that they were “trapped” by the MT output. The translators only made a few positive and negative comments about TM, which might indicate that TM is a completely integrated part of their processes. The translators also acknowledged positive aspects of MT-assisted TM and generally seemed to have a flexible and pragmatic attitude to TCI. This, for instance, expressed itself in the translators offering solutions as to how resistance from the tool could be anticipated in the future.

6.2 Discussion

The results of the analyses addressing the individual research questions have been discussed in the syntheses following the analyses in Chapter 5, and some of the results of the individual analyses have also been related to each other in these syntheses. In this section, I shall therefore try to gather the threads and discuss a number of more general considerations that the analyses have given rise to. The discussion focuses on four aspects: 1) MT-assisted TM as a complex TCI process, 2) MT in a TM context, 3) match-external revision as a potential indicator of resistance and cognitive friction and 4) individual differences as potential indicators of individual translation styles.

6.2.1 Machine Translation-assisted Translation Memory: A complex process of Translator-Computer Interaction

The fact that translators are provided with translation suggestions through the whole translation process might indicate that MT-assisted TM translation is not a very complex or demanding mental process. Also, the fact that the thesis has shown that the concordance search is the preferred match-external action for translators might suggest that MT-assisted TM translation is becoming a matter of checking provided matches against previous translations and is thus turning translation into a simple comparative exercise which, as problematized by Ehrensberger-Dow and Massey (2014), constrains the translators’ autonomy and maybe does not necessarily require skilled translators. On the face of it, this would be an understandable standpoint.

However, this thesis has demonstrated that the MT-assisted TM translation process is a complex process of TCI. For instance, the analyses have shown that the translators orchestrate different types of translation suggestions and a range of match-external actions. With the reservation that mental translation processes are not observable and can only be inferred, the study indicates that mental processes involved in MT-assisted TM translation are complex, with the translators evaluating different translation suggestions in terms of whether they are acceptable translations or need to be revised or rejected – an evaluation which, if the suggestion is not acceptable, judging from the translators’ comments in the retrospective interviews, seems to be a rapid trade-off between the time involved in either revising the suggestion and the time involved in rejecting by, most often, translating from the source-text segment.

Also, it was clear in several instances that the translators consider client preferences and the situational context of the target text. Furthermore, the study showed that the translators

attend to cohesion in the target text. Thus, they do not regard the segments as isolated chunks, but focus on the text as a cohesive entity. This expressed itself in non-linear translation processes in the editing phase and in changes implemented in the checking phase. Hence, the study does not confirm what has been problematized in the CAT literature, namely that the sentence-by-sentence approach turns translation into a sentence-replacement activity in which translators do not go back and forth in a recursive process (cf. also Bundgaard et al. 2016). As already indicated in Section 5.4.3, this finding also calls into question experimental designs where translators are not allowed to return to previous segments or to check their translations, since the present study shows that this does not reflect the translators' typical ways of interacting with an MT-assisted TM tool.

The complexity of the MT-assisted TM process was also evident in the way in which the translators accommodated resistance from the tool. This appeared in the analysis that addressed the translators' attitudes to TCI in the form of MT-assisted TM, and the process analysis provided insights into how translators handled such situations. For instance, in relation to tags, some of the translators handled resistance by copying the tags from the source-text segment and pasting them into the target segment, whereas for others, resistance seemed to trigger rejection of the matches using the Copy Source to Target function or revision of the matches by means of the *Copy/Cut* → *Copy Source to Target* → *Insert* match-external action. Furthermore, source-text elements such as words which could be transferred directly to the target segment seemed to trigger similar choices. Thus, it seemed that the translators had specialized and considered ways of interacting with the tool in specific cases. Hence, following from the above, it would appear that MT-assisted TM is a complex process of interaction between the translator and the tool in which the TM and concordance search play a central role and in which several factors are at play.

6.2.2 Machine Translation in a Translation Memory context

Since MT had just been implemented at the time of the workplace study and was thus, as it were, the newcomer in this context, it seems natural to reflect on what this thesis has contributed with in terms of knowledge about MT in a TM context. I shall do so in the following, focusing on the fact that the translators never just deleted the provided MT matches, and the fact that the translators edited less in MT matches than in a number of the TM match types, but spent more time arriving at these edits.

The study showed that no MT matches were just deleted by the translators. I was rather surprised by this finding, since MT was quite new to the translators and since the translators expressed dissatisfaction with various aspects of MT. However, the translators seemed to approach the matches in a pragmatic and constructive way, considering what they could and could not use (keeping in mind that they might also have felt a certain responsibility to do so because of their participation in the experiment). Admittedly, it could be said that they did delete some MT matches by replacing them with the source-text segment. This was most frequent in the FAQ text, but two of the translators did not reject any MT matches in this text, and the remaining translators rejected MT matches less often than they rejected 70-

74% matches. Thus, it does not seem that the translators were very inclined to reject MT matches. The fact that the translators chose to replace the MT matches with the source-text segment when they rejected them has important methodological implications for experimental studies on MT-assisted TM which I shall address in Section 6.4.2.

The analyses showed that the translators edited less in MT matches than in TM matches with match values up to 84% (and in the FAQ text up to 94%) and that they spent a similar amount of time or, more often, more time editing MT matches than TM matches. At the same time, the analyses showed that the translators used a wider range of match-external resources and functionalities in MT matches than in the TM match types. Thus, it seems that translators need more tools in their toolboxes when editing MT matches in order to produce translations which they consider adequate and this might at least partly explain why they spent relatively more time arriving at the appropriate edits in MT matches. As mentioned in Section 5.6.2.2, part of the explanation for this might also lie in the presence of metadata in TM matches and the non-presence of these in MT matches. However, it could also be related to some of the negative aspects of MT that the translators identified, as was shown in the analysis that addressed RQ7. For example, many translators explained that MT impacted negatively on their cognitive processes, for instance by disturbing their typical process and forcing them to compare a mental translation of the source segment to the provided MT match. This might cause them to spend more time on arriving at their translation. O'Brien and Moorkens (2014, pp.132–133) have also argued that this change in the translation process might explain why translators perceive post-editing as being more cognitively demanding than traditional translation. Furthermore, the translators' expressed feeling of being "trapped" by MT output might also cause them to be extra alert to MT matches and thus spend more time on considering their edits. Better information to translators about the origins of the MT output and about potential sources of resistance from the tool which the translators might experience during the interaction might help counter the perceived negative aspects of MT which might also diminish along with increased experience with MT, as suggested by some of the translators.

6.2.3 Match-external revision: Potential indicator of resistance and cognitive friction

As mentioned in Section 3.2.4, TPR has seen a growing interest in the ergonomics of the translation workplace, e.g. cognitive ergonomics related to TCI. By identifying cognitive friction in the TCI process, it is argued that we may improve the cognitive ergonomics of translation tools (O'Brien 2012; Ehrensberger-Dow 2014; Ehrensberger-Dow & O'Brien 2015). As was mentioned in Section 3.2.4, cognitive friction has been defined by Cooper as "the resistance encountered by a human intellect when it engages with a complex system of rules that change as the problem changes" (2004, p.19) and by Ehrensberger-Dow and O'Brien as "a state of being when "flow" is disturbed" (2015, p.102). In this thesis, inspired by Olohan (2011), I have drawn on Pickering's (2005) notion of "dance of agency" in order to focus on resistance and accommodation in the MT-assisted TM process. Since the notion of resistance seems to resemble the notion of cognitive friction (O'Brien 2012, p.115), we may

say that this thesis has indicated instances of cognitive friction.

Furthermore and following from this thought, we might also interpret instances of match-external revision as identified in the thesis as instances of resistance and cognitive friction. O'Brien and Teixeira (2016a), departing from their working definition of cognitive friction as "any interruption to translation flow, defined as a 'pure' transfer of the source message to the target", suggest that flow is disturbed if the translator performs a concordance or termbase search, for example. This seems to be in line with the analysis addressing RQ1 and RQ1a, in which segments belonging to the *revise* category were further categorized as belonging to either the match-internal or match-external subcategory based on whether the translator made use of resources or functionalities external to the match. Thus, following O'Brien and Teixeira's definition, instances of match-external revision may suggest that the translators experienced cognitive friction, since they left the match, interrupting the pure transfer of the source message to the target.

On the other hand, with this study showing that concordance searches account for the main part of match-external actions, and with several studies suggesting that concordance searches are the preferred external action for translators (Karamanis et al. 2010; Karamanis et al. 2011; LeBlanc 2013; LeBlanc 2017), it seems that concordance searches constitute an integral part of the TCI process. Thus, one may argue that these should not be interpreted as disturbances to the translators' flow. Furthermore, the thesis has shown that match-external actions such as the *Copy/Cut* → *Copy Source to Target* → *Insert* action appeared to constitute iterative operation patterns or cognitive routines which may also suggest that such actions are just part of fluent interaction with the tool and thus do not constitute disturbances. Following from these thoughts, if the research interest is resistance and cognitive friction, it would arguably be more appropriate to distinguish between *tool*-internal or *tool*-external revision instead, and define cognitive friction as cases where the translation process is disturbed in such a way that translators need to leave the CAT tool.⁵³

6.2.4 Individual differences: Potential indicators of individual translation styles

Throughout the analyses, in addition to addressing the results for all translators combined, I have reflected on individual differences in the translators' interaction with the tool. For instance, some translators sought match-external support more often than others, and some translators, when seeking external support, used more actions per match than others. Further, some translators interacted with the tool in certain ways when they encountered particular source-text elements which led me to suggest that some translators had iterative operation patterns. Also, the analyses suggested that the translators had individual working routines in terms of the time they spent on the editing and checking phases. This may be explained by the differences in the translators' prerequisites (as described in Section 5.1.3 and addressed again in Section 6.3.1 below), and it may also indicate that the translators

⁵³ In the current study, the main part of the total number of match-external actions were undertaken inside the CAT tool (81.6% in the FAQ text and 77.6% in the Newsletter).

have individual working styles or individual competence patterns (Hansen 2013a), i.e. different ways of interacting with the tool. This ties in with recent suggestions that CAT tools should include more personalization options to take individuality into account and thereby improve the translators' interaction with their tools by adapting the tool to the individual translator which might lead to a higher sense of autonomy and increased motivation on the part of the translator (O'Brien 2016a; O'Brien & Teixeira 2016b).

6.3 Limitations

Throughout the thesis I have sought to stress the limitations of the methodology, where appropriate. In particular, limitations associated with the applied analytical methods were stressed in the sections addressing the individual research questions in Chapter 5. In the following, I shall focus on shortcomings that related to the experimental setup which may have had an impact on the results in terms of the comparability of the match types and the two texts translated in the experiment. Further, in Section 6.3.1, I shall comment on how individual differences between the translators might have influenced the results.

First, insisting on ecological validity comes at a price. For example, since I insisted on using authentic texts, I could not fully control the number of matches in each match category and the average segment length in each match category which would have increased the comparability of the different match types. Also, the fact that the FAQ text included tags and the Newsletter did not seems to have influenced the results. For example, tags appeared to trigger the rejection of matches or the use of a specific match-external action (*Copy/Cut* → *Copy Source to Target* → *Insert*) during match-external revision in some cases in the FAQ text, whereas very few matches were rejected or revised by means of this match-external action in the Newsletter. Whether the presence or non-presence of tags is representative of the text types is, however, beyond my knowledge. Another issue relates to the fact that the FAQ text contained a number of words formatted in red. The red formatting was only meant to show the translators that the words were to remain untranslated in the target text, but although the translators were not told to do so, they generally ensured that the words were also formatted in red in the target text, probably in line with the general approach of ensuring the same layout in the target text as in the source text. However, in some cases, Translators A, B, F, G and H left the words in black in the target text. Although this is assumed to have had a minimal influence on the time spent editing the segments, the translators who always ensured that the words were formatted in red in the target text may have spent slightly more time doing this. In hindsight, I would have specifically informed the translators that the words were not meant to be formatted in red in the target text, or ideally have avoided this difference between the two texts. Furthermore, the fact that the translators worked with their own settings in SDL Trados Studio meant that there were some differences in terms of how tags were displayed in the FAQ text. Whether this impacted on, for example, the time spent on editing segments, is unclear, however, these differences reflect how the translators normally work.

Furthermore, as mentioned in Section 4.3.1.1.3.1.4.1.2, the fact that all translators translated the FAQ text first and then the Newsletter may have had a negative impact on the

findings in the sense that, for example, the translators may have edited MT matches faster at the end of the FAQ text than in the beginning and faster in the Newsletter than in the FAQ text, because they gained experience with MT along the way. In hindsight, I would have preferred to randomize the presentation of the texts (Saldanha & O'Brien 2013, p.117) and/or to include a warm-up exercise to counter this possible impact.

6.3.1 Individual differences and their potential impact on the findings

As described in Section 4.3.1.1.3.1.3, although I strove to design a setup in which the translators had similar prerequisites for solving the tasks, it was impossible to arrive at a setup where the translators had exactly the same amount of experience. Thus, there were some differences between the translators with regard to their typical translation direction, their experience with the client (Bang & Olufsen), their experience with the text types translated in the experiment and their experience with MT. As mentioned in Section 5.1.3, the differences between the individual translators may have impacted on the results in the sense that a translator who usually worked with the same translation direction as in the experiment (English into Danish), had experience working for the client (Bang & Olufsen), and had previously worked with the text types (FAQ text and Newsletter) and/or with MT could be expected to have a better basis for solving the tasks than a translator who did not. In this section, although I have not attempted to measure the potential impact of the differences between the translators quantitatively, I shall comment on whether these differences seem to have had a bearing on selected findings. I shall do so by addressing some ways in which the translators' experiences might be assumed to have impacted on different findings, namely whether experience with the client, the text types and MT seem to have influenced the time spent by the translators on the translation tasks, whether client experience seems to have impacted on the number of concordance searches and whether MT experience seems to have influenced the translators' amount of editing in MT matches.

In terms of experience with the client and the text types, Translators B and G, who had both indicated that they had experience of working with Bang & Olufsen and with the text types translated in the experiment, were the two translators to complete both translations in the shortest amount of time when the total time spent on the editing and checking phases was considered. This could indicate that their experience made them translate faster. However, Translator H, the translator who spent the greatest amount of time on both tasks, also indicated that she had experience of the text types and that she had limited experience with Bang & Olufsen. Furthermore, we might assume that MT experience could make the translators complete the translation tasks faster. Translators A, B, C and H all indicated that they had some experience with MT. However, Translators B and C were among the faster half of the translators to complete both tasks and Translators A and H were among the slower half in both texts. Translators E and G, who both indicated that they did not have any experience with MT, also spent considerably different amounts of total time on the editing and checking phases, since Translator G was among the two fastest translators in both tasks, whereas Translator E was among the slower half in both texts. Thus, on the face of it, client, text type and MT experience do not seem to be related to the total time the translators spent on the translation tasks.

Another way in which differences in the translators' experience may have impacted on the findings is the number of concordance searches conducted. For example, we might expect translators with experience of Bang & Olufsen to search for fewer words and phrases than translators without experience with this client. However, the data showed no particular pattern in this regard. For example, although Translator G who had experience of the client was among the two translators making the fewest concordance searches in both tasks, Translator D who did not have any experience of the client was also among the two translators with fewest concordance searches. Also, in both texts, Translators A and H, who indicated having limited experience of Bang & Olufsen, made more concordance searches than Translators D and E, who had no experience of the client. Thus, based on this comparison, client experience did not seem to impact on the use of the match-external action *concordance search*, at least not in an unequivocal way.

Finally, we might expect translators with no experience of MT to make more changes in the MT output than translators with MT experience who might have grown accustomed to MT output (cf. Guerberof Arenas 2012, p.44). However, Translators E and G, who had no experience of MT, were among the translators with the lowest amount of editing in MT matches in both texts, measured on average HTER scores, while Translator C who did have experience with MT was also among the translators with the lowest amount of editing in MT matches in both texts. Thus, there seems to be no direct correlation between MT experience and the amount of editing in MT matches.

Based on the above, although it is a rather qualitative way of exploring potential impacts on the findings, individual differences between the translators do not seem to have affected the findings in any obvious way.

6.4 Contribution

Based on Krings' (2005, p.344) characterisation of the three main contributions of TPR, the current thesis has contributed to describing translation processes involved in MT-assisted TM translation in a systematic way and from a number of perspectives, namely by focusing on different aspects of translators' interaction with an MT-assisted TM tool (Krings' first argument, *die wissenschaftlich-systematische Begründung*). Further, it has contributed with knowledge that can inform translator training which I shall elaborate on below (Krings' second argument, *die angewandt-übersetzungsdidaktische Begründung*). Also, the thesis has highlighted the complexity of the MT-assisted TM process and has thus indicated the high degree of professionalism required of translators (Krings' third argument, *die standespolitische Begründung*). In relation to the third argument, Göpferich (2008, p.2) argues that TPR can add to the translator's status.

In addition to addressing Krings' second argument regarding the didactic applicability of TPR, in what follows, I shall also comment on the methodological contributions of the thesis as well as on how the study might be relevant to the profession, for example in terms of the pricing of MT, and finally, how the results may be relevant to CAT tool developers.

6.4.1 Didactic applicability

Although the study was not conducted with a particular didactic focus in mind, the study's findings might be applicable in a didactic context. First, since TM was a completely integrated part of translation practice at TextMinded and since MT was being integrated with TM, if this LSP is prototypical of the development in the industry, then the present study accentuates the "widespread perception nowadays among both translation students and trainers that familiarity with translation technology is of paramount importance to embark on a successful professional career" (Gaspari et al. 2015, p.334).

Also, the findings may inform translator training in the sense that they may be used to illustrate the complexity of the MT-assisted TM process to translation students. For example, it might be useful for students to see how professional translators interact with the tool when they accept, reject and revise matches, and which match-external resources they make use of. The thesis has also highlighted sources of resistance which students may encounter in their professional careers and for which it may be beneficial to be prepared, and they may be inspired by how the professional translators in this thesis accommodated these. For example, the translators' thoughts on how their cognitive processes were impacted by MT may be interesting for translation students.

6.4.2 Methodological contribution

As mentioned in the introduction to this thesis, several scholars have argued that we need further research into translators' interactions with translation tools in the workplace. Scholars have also argued that we need experimental field studies which have a high degree of ecological validity, and the literature review also identified a lack of research into MT-assisted TM that takes the context into account and which lets translators work with their usual tools. Keeping the limitations of the study in mind as they have been described throughout the thesis, in this study, I combined a contextual study and an experimental study in a way that allowed translators to work in their usual ways at their usual workplace and which allowed for comparisons. Thus, methodologically, I hope that the study has contributed to TPR by exemplifying how such a study may be conducted, and by highlighting the pros and cons of such an endeavour. In the following, I shall comment on other ways in which the study may constitute a methodological contribution to TPR.

The study has provided insights which are relevant in terms of the design of future experimental studies of MT-assisted TM translation, especially in terms of the findings that none of the translation processes was linear and that the translators never deleted any matches and translated from scratch. In terms of the former, the study has shown that experimental designs that do not allow translators to return to previous segments and to check their translations do not seem to reflect translators' natural ways of working. Thus, if scholars wish to design studies that reflect translators' typical work practices, this should be allowed. In terms of the latter, the fact that the translators, when rejecting an MT match, translated from the source-text segment and not from scratch, seems highly relevant in terms of the design of experimental studies assessing the usefulness of MT. In such studies,

post-editing of MT is typically compared to human translation, i.e. translation from scratch. However, with the present analysis in mind, we should maybe consider comparing post-editing of MT matches to translation from the source-text segment as a supplement to or instead of comparing it to translation from scratch. At least, if translators do not ever translate from scratch, but from the source-text segment, this seems to be a relevant consideration. As noted in my field notes, one of the translators told me during an informal chat that she thought that only one of the in-house translators preferred a blank segment and that the translators therefore had their CAT tool set to copy the source-text segment to the target segment if the target segment was empty. If it is generally the case that translators translate from the source-text segment if no TM match is provided, this should be taken into account when we study the gains we can expect from adding MT to the setup.

Furthermore, another potential methodological contribution relates to the risk pointed out in the literature that translators might not be able to verbalise their processes if the translation task has become routine, i.e. the risk of automaticity. In this study, since all translators participating in the experiment were very experienced translators, I considered the possibility that the translators might not be able to verbalize their processes in the retrospective interviews. However, I was positively surprised. This was, for example, evident in relation to the analysis addressing RQ4 concerning the checking phase of the translation processes. During the retrospective interviews, we watched the translators' actions during the editing phase while we talked about the different segments, and the translators were thus not able to see the changes they made later during the checking phase. However, it was interesting to note that in the 16 cases where the translators mentioned during the interview that changes were implemented during the checking phase, they were also able to tell me exactly how they would later change the segments.⁵⁴ A possible explanation for this might be that editing MT matches was quite new to the translators and thus not routine, i.e. that the novelty of the task might have influenced their ability to verbalize their processes. Another possible explanation might be that the replay of the translation process made the translators recall their thoughts during translation (Hansen 2006, p.7), and the fact that I repeatedly asked the translators to tell me what they were thinking at specific points during the process may have contributed to them actually reporting cognitive processes heeded at the time rather than inferring post hoc what they must have thought (cf. Ericsson & Simon 1984, pp.19–20). This may be useful to other TPR scholars. A final possible explanation might be that the translation process, no matter the extent of translators' experience, does not become entirely automatized. It would be interesting to explore further whether different extents of translation experience are reflected in the translators' ability to verbalize their processes.

⁵⁴ In two of these cases, namely when Translator G and I talked about his process when editing the matches in segments 17 and 24 in the Newsletter, I unfortunately indicated what he would later change during the checking phase. In segment 17, I told him that he would later change the order of some parts of the sentence (although I did not tell him which parts), and in segment 24, I told him that he would later insert a certain word. In the remaining cases, the translators spontaneously told me about the changes they would later implement.

6.4.3 Professional applicability

Hopefully, the findings of the thesis are also relevant for the translation profession. For example, other professional translators may be inspired by how the translators in the study interacted with the MT-assisted TM tool, and the study's findings regarding the TM/MT threshold may be useful to translators and LSPs. Furthermore, one of the uncertainties TextMinded had with respect to the implementation of MT was the pricing of MT, especially in terms of the need for a predictive pricing model, i.e. a way of determining an appropriate price when clients contact TextMinded and ask for a translation before one knows the time or amount of editing needed to solve the task. As indicated above, the study has suggested that there is some mismatch between the time spent on editing MT matches and the amount of editing implemented when compared to TM matches, i.e. although the translators edit less in MT matches than in several TM match types, it takes more time for translators to arrive at the appropriate edits. This seems to be a relevant finding in terms of pricing for MT in the sense that it implies that a fee based on the time spent is more beneficial to translators than one based on the amount of editing. This echoes Guerbero of Arenas' (2012, p.24) concern that used in isolation, the amount of editing might not be a valid measurement, and it also seems to be in line with the TAUS Best Practice Guidelines (TAUS 2013) for pricing MT which underlines that post-editing speed should always be taken into account. This, however, does not solve the challenge of establishing an appropriate price before the translation task has been undertaken. Tentatively, one might conjecture that aspects such as the number of terms included in the applied termbase and the identification of specific sources of resistance such as the number of tags in segments translated by means of MT are useful in arriving at a suitable pricing model. However, this needs further exploration.

6.4.4 Design applicability

Although it was not a primary goal of the thesis, the analyses have revealed aspects which may be relevant to CAT tool developers. For example, the study has highlighted that tags constitute a problematic issue in not being transferred correctly to the matches, and the integration of the MT engine and the termbase appeared to cause problems in some instances. Furthermore, the study indicates that it would be productive if words which are meant to remain untranslated in the target text could be easily included in a termbase set to overrule the output of the MT engine, as suggested by one of the translators. Finally, since iterative operation patterns were identified for some of the translators and since other analyses indicated that the translators have individual working styles, the study seems to echo researchers' suggestion that CAT tools should permit increased personalization possibilities, as mentioned above.

6.5 2013 vs. 2016: A brief update

In June 2016, I visited TextMinded again and had an informal talk with two of the translators who participated in the experiment approximately three years previously. During this talk, the translators told me that TextMinded had switched since 2013 to having *Memsources* as their primary CAT tool. They now used MT on all assignments, and the translators were

convinced that the quality of the MT output had improved tremendously since the experiment. As one of them stated, they were now “super optimistic” about MT. For instance, they explained that building a termbase, which could be used in the training of the MT engine, had now become much easier and that they did not experience as many problems with tags as they did in the experiment. The translators were convinced that the implementation of MT had increased their productivity and they told me that the successful implementation of MT at TextMinded was due to one of the managers having pushed this development and the skilled internal team having designed the technical platform. They also made the point that translators need to have a particular mindset if MT is to increase their productivity. One of the translators explained that if you are the “classic language nerd” and have a lot of hobby-horses, you will not be able to reap the benefits of MT. Instead, translators should be willing to accept translation suggestions which might not be exactly what they would have come up with themselves, but which are still adequate solutions. In other words, translators should be able to kill their darlings. They also expressed that the review phase is still central, since the reviewer can evaluate the translation “from above” instead of focusing on single sentences. In terms of review, they were not at all surprised when I told them that the translators had spent very different amounts of time on reviewing the translations in the review part of the experiment. According to these translators, this was very typical. Generally, the translators were very positive about the development and the future. As one of the translators stated: “I think what I produce today is better than what I produced earlier [without MT]” to which the other translator replied: “there is **no** doubt, there is **no** doubt”.

6.6 Avenues for further research

The thesis has shown that we still need more knowledge about translators’ interactions with and attitudes to MT-assisted TM translation. In the following, I give some examples of roads that may be taken from here. Overall, since this study only investigated one language direction, two texts from one client, one specific MT-assisted TM tool and included a limited number of translators from one LSP, it is relevant to conduct similar studies including other language combinations, other text types and other MT-assisted TM tools than the one(s) investigated in this thesis as well as include more translators and translators from other LSPs. After all, as pointed out by Teixeira, “it is only the combination of several studies (...) that can allow us to think that some conclusions are of a general nature” (2014b, p.173). More specifically, for instance, it would be highly interesting to explore potential individual translator styles in the context of MT-assisted TM, for example in terms of whether and how such styles impact on translators’ productivity and the benefits they (and their employers) reap from MT. Along the same lines, research into the impact of personalization on translators’ interaction with translation tools would be valuable. Also, one could explore how it would influence the processes if all words which are to remain untranslated in the target text were included in the termbase (and thus set to overrule the output of the MT engine), and if formatting and tags were transferred correctly to the matches. It would likewise be interesting to combine the methodology in this thesis with eye-tracking in order to explore the process leading to translators’ choices to accept, reject or revise matches. Another aspect that could be explored further relates to how translators interact with MT

matches whose quality levels are different. Finally, in line with the finding in this thesis that the translators never deleted matches and translated them from scratch, it would be highly interesting to compare editing of TM and MT matches to translation from the source text segment (cf. Section 6.4.2).

Research question	Key findings
RQ1: <i>To what extent do the translators accept, reject and revise TM and MT matches?</i>	<p><u>FAQ text:</u> CM and 100% matches were mostly accepted. 95-99% matches were mostly revised or accepted. 85-94% matches were mostly rejected or revised. 75-84%, 70-74% and MT matches were mostly revised. 9% of MT matches were accepted. 29% of 70-74% and 12% of MT matches were rejected; this led to the suggestion that it might be preferable to set the TM/MT threshold higher than 70%.</p> <p><u>Newsletter:</u> 100% matches were mostly accepted. 95-99%, 85-94%, 75-84%, 70-74% and MT matches were mostly revised. 4% of MT matches were accepted. Matches were seldom rejected.</p>
RQ1a: <i>How do the translators interact with the MT-assisted TM tool when they accept, reject and revise matches?</i>	<p><u>FAQ text:</u> Matches were typically accepted without research being conducted to verify the proposed translation. No matches were rejected using “pure” deletion, i.e. no segments were translated from scratch. Instead, the match was replaced with the source segment or, in a few cases, with an MT match. Certain source-text elements such as words which can be directly transferred to the translation, formatting and tags seemed to trigger rejection. TM matches with match values from 75% and up were mostly revised by means of match-internal revision, whereas 70-74% and MT matches were mostly revised by means of match-external revision. Match-external revision was used in 93% of 70-74% matches and 62% of MT matches; this supported the suggestion that it might be preferable to set the TM/MT threshold higher than 70%. AutoSuggest suggestions were seldom employed by the translators. The concordance search seemed to be the preferred match-external action.</p> <p><u>Newsletter:</u> Matches were typically accepted without research. No matches were rejected using “pure” deletion, i.e. no segments were translated from scratch. Instead, the match was replaced with the source segment or with an MT match. TM matches were mostly revised by means of match-internal revision, whereas MT matches were mostly revised by means of match-external revision. AutoSuggest suggestions were seldom employed by the translators. The concordance search seemed to be the preferred match-external action.</p>
RQ2: <i>How much time do the translators spend on editing TM and MT matches, respectively?</i>	<p><u>FAQ text:</u> On average, the translators’ editing speeds (in words per minute) in the different match types were: 100% - 5874.3; 95-99% - 33.7; 85-94% - 17.1; 75-84% - 31.3; 70-74% - 16.4; MT - 16.6. Thus, translators spent less time editing 100%, 95-99%, 85-94% and 75-84% matches than they did editing MT matches. The editing speeds for 70-74% and MT matches were similar, with a slightly higher editing speed for MT matches.</p> <p><u>Newsletter:</u> On average, the translators’ editing speeds (in words per minute) in the different match types were: 95-99% - 94.1; 85-94% - 35.2; 75-84% - 28.6; 70-74% - 23.3; MT - 13.7. Thus, the translators spent less time editing all TM match types than they did editing MT matches.</p>
RQ3: <i>Do the translators edit the matches in a linear or non-linear manner?</i>	<p><u>FAQ text:</u> None of the translators’ processes were linear, i.e. all translators revisited previous segments during the editing phase.</p> <p><u>Newsletter:</u> None of the translators’ processes were linear, i.e. all translators revisited previous segments during the editing phase.</p>
RQ4: <i>Do the translators check their translations and if so, are changes implemented in this phase essential or preferential?</i>	<p><u>FAQ text:</u> Except for one, all translators checked their translation. Of the total time spent on the editing and checking phases, the translators spent between 0 and 20% on checking their translation. 56.8% of the changes were essential, 43.2% were preferential.</p> <p><u>Newsletter:</u> Except for one, all translators checked their translation. Of the total time spent on the editing and checking phases, the translators spent between 0 and 36.9% on checking their translation. 34.4% of the changes were essential, 65.6% were preferential.</p>

<p>RQ5: <i>How much do the translators modify TM and MT matches, respectively?</i></p>	<p><u>FAQ text:</u> On average, the amount of editing (measured by means of HTER scores) in the different match types was: CM - 0.00; 100% - 0.02; 95-99% - 0.11; 85-94% - 0.42; 75-84% - 0.40; 70-74% - 0.38; MT - 0.28. Thus, the translators edited less in MT matches than in 70-74%, 75-84% and 85-94% matches. They edited less in CM, 100% and 95-99% than in the other match types.</p> <p><u>Newsletter:</u> On average, the amount of editing (measured by means of HTER scores) in the different match types was: 100% - 0.18; 95-99% - 0.04; 85-94% - 0.16; 75-84% - 0.44; 70-74% - 0.56; MT - 0.41. Thus, the translators edited less in MT matches than in 70-74% and 75-84% matches. They edited less in 100% and 95-99% than in the other match types.</p>
<p>RQ6: <i>How much time do the translators spend on reviewing their colleagues' translations and are changes implemented in this phase essential or preferential?</i></p>	<p><u>FAQ text:</u> The reviewers spent between 6 and 30 minutes on reviewing the translation. 62.7% of the changes were essential, 37.3% were preferential.</p> <p><u>Newsletter:</u> The reviewers spent between 3.5 and 36 minutes on reviewing the translation. 40% of the changes were essential, 60% were preferential.</p>
<p>RQ7: <i>What are the translators' attitudes to TCI in the form of MT-assisted TM translation?</i></p>	<p>The translators identified many negative aspects of MT, but also acknowledged positive aspects. They made few positive and negative comments about TM. They generally seemed to have a flexible and pragmatic attitude to TCI in the form of MT-assisted TM translation. This, for instance, found expression in the translators offering solutions as to how resistance from the tool could be anticipated in the future.</p>

Table 53. Key findings of this thesis

6.7 Final remarks

In Table 53, the key findings are provided, thus answering the research questions of the thesis in a short form. This thesis has explored translators' interactions with an MT-assisted TM tool and their attitudes to this interaction, contributing with insights into the MT-assisted TM translation process. However, we still need more knowledge of how translators interact with the tools that are now an inseparable part of translation, and optimally, this knowledge should be translated (no pun intended) into (re)designs of CAT tools in such a way that translators are (still?) happy with their profession. After all, there seems to be no reason to believe that the influence of technology on translation will decrease.

7. Summary in English

Due to globalisation and the explosion in digital content during the last decades, demand for translation has increased significantly. This demand cannot be met by traditional human translation. Therefore, translation tools or so-called computer-assisted translation (CAT) tools are employed in an attempt to increase productivity. Translation Memory (TM) has been the most significant type of CAT tool for many years, but this tool is increasingly being combined with Machine Translation (MT). This combination, so-called MT-assisted TM translation, is the main concern of this thesis.

When working with an MT-assisted TM tool, a translator receives suggestions for the translation of every sentence in the source text. In the case of TM, suggestions come from translations previously produced by the translator him- or herself or other human translators, whereas in the case of MT, suggestions are automatically generated by means of MT software.

The purpose of this thesis is twofold: to investigate how professional translators interact with an MT-assisted TM tool, and to explore translators' attitudes to this interaction. Theoretically, the thesis is situated within the field of Translation Studies, more specifically within the subfield of Translation Process Research, and it regards the MT-assisted TM process as a context-dependent activity and as so-called Translator-Computer Interaction (TCI) (O'Brien 2012). To address the twofold purpose of the thesis, seven research questions are formulated. The first six research questions explore different aspects of translators' interaction with the tool, for instance, whether the translators choose to accept, reject or revise the translation suggestions they are offered, how they interact with the tool in relation to these choices, how much time they spend on editing different types of translation suggestions, how much they edit the different suggestions, whether they check their own translations in a final phase and which changes are potentially implemented in this phase. The seventh research question explores the translators' attitudes towards TCI in the form of MT-assisted TM translation.

To address these questions, the thesis employs an embedded mixed methods research design. Recognising the context-dependence of the translation process, the study is conducted as a workplace study at the Danish Language Service Provider, TextMinded Danmark A/S, i.e. at a workplace where professional translations are undertaken. In the workplace study, a contextual study and an experimental study are embedded. The contextual study employs the methods of observation, semi-structured interviews and document collection. The experimental study is conducted as an experiment with eight translators who each translate two source texts from the Danish company Bang & Olufsen using an MT-assisted TM tool. The methods for data collection used in the experimental study are screen recording, keystroke logging, observation, retrospective interviews and a post-experimental questionnaire.

The analyses show that the MT-assisted TM process involves complex interactions between the translator and the tool. The translators manage different types of translation suggestions and draw on different resources and functionalities both inside and outside the tool while considering client preferences and the situational context of the target text, accommodating resistance posed by the tool and attending to cohesion in the target text. Also, although the translators identify many negative aspects of MT in particular, they seem to have a flexible and pragmatic attitude towards TCI in the form of MT-assisted TM translation.

The thesis contributes empirically with new knowledge of translators' interactions with an MT-assisted TM tool and translators' attitudes to these interactions. It also contributes theoretically and methodologically to TPR, especially research into translation processes in the workplace. Finally, the findings may have practical relevance for translation trainers and translation studies, and the identification of potential technological improvements may be valuable to developers of translation tools.

References

O'Brien, S., 2012. Translation as human-computer interaction. *Translation Spaces*, 1(1), pp. 101–122.

8. Resumé på dansk

Globaliseringen og en eksplosion i produktionen af digitalt indhold har medført en markant stigning i efterspørgslen efter oversættelse. Denne efterspørgsel kan ikke imødekommes af traditionel humanoversættelse. Derfor anvendes oversættelsesværktøjer eller såkaldte *Computer-Assisted Translation* (CAT)-værktøjer i et forsøg på at højne produktiviteten. Oversættelseshukommelser, på engelsk *Translation Memory* (TM), har i mange år været det mest centrale CAT-værktøj, men i de senere år er denne teknologi i stigende grad blevet integreret med maskinoversættelse, på engelsk *Machine Translation* (MT). Denne kombination, såkaldt MT-støttet TM-oversættelse, er denne afhandlings primære interesse.

Under arbejdet med et MT-støttet TM-værktøj modtager oversætteren forslag til oversættelsen af alle sætninger i udgangsteksten. Disse forslag kommer enten fra en TM, dvs. fra oversættelser der tidligere er blevet produceret af den samme eller en anden oversætter, eller fra et MT-system, som automatisk har genereret en oversættelse.

Formålet med afhandlingen er at undersøge, hvordan professionelle oversættere interagerer med et MT-støttet TM-oversættelsesværktøj samt at undersøge oversætternes holdninger til denne interaktion. Teoretisk er afhandlingen forankret i oversættelsesprocesforskningen, og den anskuer MT-støttet TM-oversættelse som en kontekstafhængig aktivitet og som såkaldt Oversætter-Computer Interaktion, på engelsk *Translator-Computer Interaction* (O'Brien 2012). Afhandlingens todelte formål udmønter sig i syv forskningsspørgsmål. De seks første undersøger forskellige aspekter af oversætters interaktion med værktøjet, bl.a. om oversætterne vælger at acceptere, afvise eller revidere de tilbudte oversættelsesforslag, hvordan de interagerer med værktøjet i forbindelse med disse valg, hvor meget tid de bruger på at rette de forskellige oversættelsesforslag, hvor meget de retter i de forskellige forslag, hvorvidt de læser korrektur på deres oversættelse i en afsluttende fase, og hvilke rettelser der eventuelt foretages i denne fase. Det syvende forskningsspørgsmål undersøger oversætternes holdninger til interaktionen.

For at adressere disse forskningsspørgsmål benytter afhandlingen sig af et mixed methods-forskningsdesign. I erkendelse af oversættelsesprocessens kontekstafhængige natur gennemføres studiet hos det danske oversætterbureau, TextMinded Danmark A/S, dvs. på professionelle oversætters arbejdsplads. Forskningsdesignet omfatter et kontekstuel studie samt et eksperimentelt studie, som er indlejret i det kontekstuelle studie. I det kontekstuelle studie anvendes som dataindsamlingsmetoder observation, semi-struktureret interview og dokumentindsamling. Det eksperimentelle studie gennemføres som et eksperiment med otte professionelle oversættere, der hver oversætter to tekster fra Bang & Olufsen med et MT-støttet TM-værktøj. De dataindsamlingsmetoder, der anvendes i det eksperimentelle studie, er screen recording, keystroke logging, observation, retrospektivt interview og et post-eksperimentelt spørgeskema.

Resultaterne viser, at den MT-støttede TM-proces er en kompleks interaktion mellem oversætteren og værktøjet. Det fremgår bl.a. af analyserne, at oversætterne orkestrerer forskellige typer oversættelsesforslag og trækker på forskellige hjælpemidler både inden for og uden for værktøjet, alt imens de tager højde for kundepræferencer og måltekstens situationelle kontekst, mens de imødekommer modstand fra værktøjet, og mens de sørger for, at målteksten er kohærent. Desuden viser afhandlingen, at selvom oversætterne påpeger en lang række negative aspekter af MT i særdeleshed, så lader de til at have en fleksibel og pragmatisk holdning til MT-støttet TM-oversættelse.

Afhandlingen bidrager med ny viden om oversætteres interaktion med et MT-støttet TM-værktøj og om oversætteres holdninger til denne interaktion. Afhandlingen er derudover et teoretisk og metodisk bidrag til oversættelsesprocesforskningen, især forskning i oversættelsesprocesser i den kontekst, hvor disse typisk udspiller sig, dvs. på professionelle oversætteres arbejdsplads. Endelig har resultaterne relevans for undervisere i oversættelse og for studerende, og afhandlingen har identificeret en række muligheder for teknologiske forbedringer, der kan have relevans for udviklere af oversættelsesteknologi.

Referencer

O'Brien, S., 2012. Translation as human-computer interaction. *Translation Spaces*, 1(1), pp. 101–122.

9. List of appendices

Appendices 1-9 can be found at the end of the thesis. The anonymized translations produced in the MT-assisted TM translation part of the experimental study as well as the transcribed and anonymized retrospective interviews have been provided as confidential appendices for the assessment committee only.

Appendix 1. Source text and matches – FAQ

Appendix 2. Source text and matches – Newsletter

Appendix 3. Instructions for experiment

Appendix 4. Post-experimental questionnaire

Appendix 5. Reference text for the FAQ text

Appendix 6. Process examples with parts of retrospective interviews

Appendix 7. Match-external actions for all translators

Appendix 8. Changes implemented during the checking phase

Appendix 9. Changes implemented during review

Appendix 10. Translations of the FAQ text (CONFIDENTIAL)

- Translator A
- Translator B
- Translator C
- Translator D
- Translator E
- Translator F
- Translator G
- Translator H

Appendix 11. Translations of the Newsletter (CONFIDENTIAL)

- Translator A
- Translator B
- Translator C
- Translator D
- Translator E
- Translator F
- Translator G
- Translator H

Appendix 12. Retrospective interview – Translator A (CONFIDENTIAL)

Appendix 13. Retrospective interview – Translator B (CONFIDENTIAL)

Appendix 14. Retrospective interview – Translator C (CONFIDENTIAL)

Appendix 15. Retrospective interview – Translator D (CONFIDENTIAL)

Appendix 16. Retrospective interview – Translator E (CONFIDENTIAL)

Appendix 17. Retrospective interview – Translator F (CONFIDENTIAL)

Appendix 18. Retrospective interview – Translator G (CONFIDENTIAL)

Appendix 19. Retrospective interview – Translator H (CONFIDENTIAL)

10. References

- Alcina, A., 2008. Translation technologies: Scope, tools and resources. *Target*, 20(1), pp. 79–102.
- Allen, J., 2003. Post-editing. In H. Somers, ed. *Computers and Translation: A translator's guide*. Philadelphia: John Benjamins Publishing Company, pp. 297–317.
- ALPAC, 1966. *Languages and machines: computers in translation and linguistics - A Report by the Automatic Language Processing Advisory Committee*, Washington, D.C.: National Academy of Sciences, National Research Council.
- Alves, F., 2003. Foreword: Triangulation in process oriented research in translation. In F. Alves, ed. *Triangulating Translation: Perspectives in Process-oriented Research*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. vii–x.
- Alves, F. & Liparini Campos, T., 2009. Translation Technology in Time: Investigating the Impact of Translation Memory Systems and Time Pressure on Types of Internal and External Support. In S. Göpferich, A. L. Jakobsen, & I. M. Mees, eds. *Behind the Mind. Methods, Models and Results in Translation Process Research*. Copenhagen: Samfundslitteratur, pp. 191–218.
- Alves, F. et al., 2016. Analysing the Impact of Interactive Machine Translation on Post-editing Effort. In M. Carl, S. Bangalore, & M. Schaeffer, eds. *New Directions in Empirical Translation Process Research: Exploring the CRITT TPR-DB*. Cham: Springer, pp. 77–94.
- Aoidh, E. Mac, Wilson, D.C. & Bertolotto, M., 2009. A Study of Spatial Interaction Behaviour for Improved Delivery of Web-Based Maps. In J. D. Carswell, A. S. Fotheringham, & G. McArdle, eds. *Web and Wireless Geographical Information Systems, 9th International Symposium*. Berlin/Heidelberg/New York: Springer, pp. 120–134.
- Arthern, P.J., 1979. Machine Translation and Computerized Terminology Systems: A Translator's Viewpoint. In B. M. Snell, ed. *Translating and the Computer: proceedings of a seminar*. Amsterdam: North-Holland Publishing Company, pp. 77–108.
- Aziz, W., de Sousa, S. & Specia, L., 2012. PET: a Tool for Post-editing and Assessing Machine Translation. In *Proceedings of the Eighth International Conference on Language Resources and Evaluation*. Istanbul, pp. 3982–3987.
- Bar-Hillel, Y., 1960. The Present Status of Automatic Translation of Languages. *Advances in Computers*, 1, pp. 91–163.
- Bédard, C., 2000. Mémoire de traduction cherche traducteur de phrases. *Traduire - Revue française de la traduction*, 186, pp. 41–49.
- Beesley, K.R., 1986. Machine-assisted translation with a human face. *Data Processing*, 28(5), pp. 251–257.
- Beyer, H. & Holtzblatt, K., 1998. *Contextual design: defining customer-centered systems*, San Francisco: Morgan Kaufmann Publishers.
- Blomberg, J., 1995. Ethnography: aligning field studies of work and system design. In A. F. Monk & G. N. Gilbert, eds. *Perspectives on HCI: Diverse Approaches*. London: Academic Press, pp. 175–197.
- Bowker, L., 2002. *Computer-Aided Translation Technology: A Practical Introduction*, Ottawa: University of Ottawa Press.
- Bowker, L., 2005. Productivity vs Quality? A pilot study on the impact of translation memory systems. *Localisation Focus: The International Journal of Localisation*, 4(1), pp. 13–20.
- Bowker, L., 2015. Computer-aided translation. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 88–104.
- Bowker, L. & Fisher, D., 2010. Computer-aided translation. In Y. Gambier & L. van Doorslaer, eds. *Handbook of Translation Studies. Volume 1*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 60–65.

- Brems, E., Meylaerts, R. & van Doorslaer, L., 2014. Translation Studies: looking back and looking forward. In E. Brems, R. Meylaerts, & L. van Doorslaer, eds. *The Known Unknowns of Translation Studies*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 1–16.
- Brooks, J. & King, N., 2012. Qualitative psychology in the real world: The utility of template analysis. In *2012 British Psychological Society Annual Conference*. London, pp. 1–16.
- Bruckner, C. & Plitt, M., 2001. Evaluating the Operational Benefit of Using Machine Translation Output as Translation Memory Input. In *Machine Translation in the Information Age (Proceedings of the 8th MT Summit organised by the European Association for Machine Translation - MT evaluation workshop)*. Santiago de Compostela, pp. 1–5.
- Bundgaard, K., Christensen, T.P. & Schjoldager, A., 2016. Translator-Computer Interaction in Action — an Observational Process Study of Computer-Aided Translation. *The Journal of Specialised Translation*, 25, pp. 106–130.
- Bundgaard, K., in press. Translator Attitudes towards Translator-Computer Interaction - Findings from a Workplace Study. To appear in *Hermes - Journal of Language and Communication Studies*, 57.
- Candel-Mora, M.Á. & Polo, L.R., 2013. Translation technology in institutional settings: A decision-making framework for the implementation of computer-assisted translation systems. In B. Mesa-Lao, P. Sánchez-Gijón, & O. Torres-Hostench, eds. *Conducting Research in Translation Technologies*. Bern: Peter Lang, pp. 71–92.
- Carl, M., Bangalore, S. & Schaeffer, M., 2016. Introduction and Overview. In M. Carl, S. Bangalore, & M. Schaeffer, eds. *New Directions in Empirical Translation Process Research: Exploring the CRITT TPR-DB*. Cham: Springer, pp. 3–12.
- Carroll, J.M., 1991. Introduction: The Kittle House Manifesto. In J. M. Carroll, ed. *Designing Interaction: Psychology at the Human-Computer Interface*. Cambridge: Cambridge University Press, pp. 1–16.
- Carroll, J.M., 1997. Human-Computer Interaction: Psychology as a Science of Design. *Annual Review of Psychology*, 48, pp. 61–83.
- Carroll, J.M., 2013. Human Computer Interaction - brief intro. In M. Soegaard & R. F. Dam, eds. *The Encyclopedia of Human-Computer Interaction*. Aarhus: The Interaction Design Foundation. Available at: http://www.interaction-design.org/encyclopedia/human_computer_interaction_hci.html [Accessed February 2, 2017].
- Carroll, J.M., Kellogg, W.A. & Rosson, M.B., 1991. The Task-Artifact Cycle. In J. M. Carroll, ed. *Designing Interaction: Psychology at the Human-Computer Interface*. Cambridge: Cambridge University Press, pp. 74–102.
- Cettolo, M. et al., 2014. Translation project adaptation for MT-enhanced computer assisted translation. *Machine Translation*, 28(2), pp. 127–150.
- Chen, M.-C., Anderson, J.R. & Sohn, M.-H., 2001. What can a mouse cursor tell us more? Correlation of eye/mouse movements on web browsing. In *CHI 2001 - Extended Abstracts on Human Factors in Computing Systems*. pp. 281–282.
- Chesterman, A., 2009. The Name and Nature of Translator Studies. *Hermes - Journal of Language and Communication Studies*, 42, pp. 13–22.
- Chesterman, A., 2013. Models of what processes? *Translation and Interpreting Studies*, 8(2), pp. 155–168.
- Christensen, T.P., 2011. Studies on the Mental Processes in Translation Memory-assisted Translation – the State of the Art. *trans-kom*, 4(2), pp. 137–160.
- Christensen, T.P. & Schjoldager, A., 2010. Translation-Memory (TM) Research : What Do We Know and How Do We Know It ? *Hermes - Journal of Language and Communication Studies*, (44), pp. 89–102.

- Christensen, T.P. & Schjoldager, A., 2011. The Impact of Translation Memory (TM) Technology on Cognitive Processes: Student-Translators' Retrospective Comments in an Online Questionnaire. In B. Sharp et al., eds. *Human-machine Interaction in Translation*. Copenhagen: Samfundslitteratur, pp. 119–130.
- Christensen, T.P. & Schjoldager, A., 2014. *Kortlægning af anvendelse af oversættelsesværktøjer i sprogindustrien*, Aarhus: Department of Business Communication, School of Business and Social Sciences, Aarhus University.
- Christensen, T.P. & Schjoldager, A., 2016. Computer-aided translation tools – the uptake and use by Danish translation service providers. *The Journal of Specialised Translation*, 25, pp. 89–105.
- Cooper, A., 2004. *The Inmates are Running the Asylum: Why Hi-Tech Products Drive us Crazy and How to Restore the Sanity*, Indianapolis: Sams Publishing.
- Crabtree, B.J. & Miller, W.L., 1999. Using Codes and Code Manuals: A Template Organizing Style of Interpretation. In B. J. Crabtree & W. L. Miller, eds. *Doing Qualitative Research*. Thousand Oaks/London/New Delhi: SAGE Publications, pp. 163–177.
- Creswell, J.W., 2014. *Research design: Qualitative, quantitative and mixed methods approaches* 4th ed., Thousand Oaks, California: SAGE Publications.
- Creswell, J.W. et al., 2003. Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie, eds. *Handbook of mixed methods in social and behavioral research*. Thousand Oaks/London/New Delhi: SAGE Publications, pp. 209–240.
- Creswell, J.W. & Plano Clark, V.L., 2011. *Designing and conducting mixed methods research*, Thousand Oaks/London/New Delhi: SAGE Publications.
- Cronin, M., 2010. The Translation Crowd. *Revista Tradumàtica*, 8, pp. 1–7.
- Dam-Jensen, H. & Heine, C., 2009. Process Research Methods and Their Application in the Didactics of Text Production and Translation - Shedding Light on the Use of Research Methods in the University Classroom. *trans-kom*, 2(1), pp. 1–25.
- Dam-Jensen, H. & Heine, C., 2013. Writing and translation process research: Bridging the gap. *Journal of Writing Research*, 5(1), pp. 89–101.
- Dansk Sprognævn, 2016. Retskrivningsordbogen. Available at: <https://dsn.dk> [Accessed January 31, 2017].
- Daymon, C. & Holloway, I., 2011. *Qualitative research methods in public relations and marketing communications* 2nd ed., New York/London: Routledge.
- de Almeida, G., 2013. *Translating the post-editor: an investigation of post-editing changes and correlations with professional experience across two Romance languages*. PhD thesis, Dublin City University.
- DeCamp, J. & Zetsche, J., 2015. A history of translation technology in the United States. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 375–392.
- DePalma, D.A. et al., 2016. *The Language Services Market: 2016*, Cambridge: Common Sense Advisory.
- Désilets, A. et al., 2008. Reliable Innovation: A Tecchie's Travels in the Land of Translators. In *8th Association of Machine Translation in the Americas Conference*. Hawaii, pp. 339–345.
- Désilets, A. et al., 2009. How Translators Use Tools and Resources to Resolve Translation Problems: an Ethnographic Study. In *MT Summit XII - Workshop: Beyond Translation Memories: New Tools for Translators*. Ottawa, pp. 1–8.
- Dictionary.com, 2017. British Dictionary definitions for grammatical. Available at: <http://www.dictionary.com/browse/grammatical?s=t> [Accessed January 31, 2017].
- Dillon, S. & Fraser, J., 2006. Translators and TM: An Investigation of translators' perceptions of translation memory adoption. *Machine Translation*, 20, pp. 67–79.
- Doherty, S., 2016. The Impact of Translation Technologies on the Process and Product of

- Translation. *International Journal of Communication*, 10, pp. 947–969.
- Doherty, S. & Moorkens, J., 2013. Investigating the experience of translation technology labs: pedagogical implications. *The Journal of Specialised Translation*, 19, pp. 122–136.
- Dragsted, B., 2004. *Segmentation in Translation and Translation Memory Systems – An Empirical Investigation of Cognitive Segmentation and Effects of Integrating a TM System into the Translation Process*. PhD thesis, Copenhagen Business School.
- Dragsted, B., 2006. Computer-aided translation as a distributed cognitive task. *Pragmatics & Cognition*, 14(2), pp. 443–464.
- Dunne, K.J., 2013a. Computer-Assisted Translation. In C. A. Chapelle, ed. *The Encyclopedia of Applied Linguistics*. Chichester: Blackwell Publishing, pp. 1–5.
- Dunne, K.J., 2013b. Translation Tools. In C. A. Chapelle, ed. *The Encyclopedia of Applied Linguistics*. Chichester: Blackwell Publishing, pp. 1–8.
- Eagly, A.H. & Chaiken, S., 1995. Attitude Strength, Attitude Structure, and Resistance to Change. In R. E. Petty & J. A. Krosnick, eds. *Attitude Strength: Antecedents and Consequences*. Mahwah, New Jersey: Lawrence Erlbaum Associates, pp. 413–432.
- Ehrensberger-Dow, M., 2014. Challenges of translation process research at the workplace. In R. M. Martín, ed. *Minding Translation - MonTI Special Issue 1*. pp. 355–383.
- Ehrensberger-Dow, M. & Englund Dimitrova, B., 2014. Translation as an act and event: Exploring the Interface - Panel description for panel 17 at the IATIS 5th International Conference – Belo Horizonte (Brazil) – 7-10 July 2015. Available at: <http://iatis.org/index.php/iatis-belo-horizonte-conference/item/1001-panel-17> [Accessed February 2, 2017].
- Ehrensberger-Dow, M. & Heeb, A.H., 2016. Investigating the ergonomics of a technologized translation workplace. In R. Muñoz Martín, ed. *Reembedding Translation Process Research*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 69–88.
- Ehrensberger-Dow, M. & Massey, G., 2014. Cognitive Ergonomic Issues in Professional Translation. In J. W. Schwieter & A. Ferreira, eds. *The development of translation competence: theories and methodologies from psycholinguistics and cognitive science*. Cambridge: Cambridge Scholars Publishing, pp. 58–86.
- Ehrensberger-Dow, M. & Massey, G., 2015. Translation process research in the workplace. *EST Newsletter No. 46*, pp. 11–12.
- Ehrensberger-Dow, M. & O'Brien, S., 2015. Ergonomics of the translation workplace: Potential for cognitive friction. *Translation Spaces*, 4(1), pp. 98–118.
- Englund Dimitrova, B., 2010. Translation process. In Y. Gambier & L. van Doorslaer, eds. *Handbook of Translation Studies. Volume 1*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 406–411.
- Englund Dimitrova, B. & Tiselius, E., 2014. Retrospection in interpreting and translation: Explaining the process? In R. M. Martín, ed. *Minding Translation - MonTI Special Issue 1*. pp. 177–200.
- Ericsson, K.A. & Simon, H.A., 1980. Verbal Reports as Data. *Psychological Review*, 87(3), pp. 215–251.
- Ericsson, K.A. & Simon, H.A., 1984. *Protocol Analysis: Verbal Reports as Data*, Cambridge and London: The Massachusetts Institute of Technology.
- Federico, M., Cattelan, A. & 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, pp. 1–10.
- 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.
- Ferreira, A., Schwieter, J.W. & Gile, D., 2015. The position of psycholinguistic and cognitive

- science in translation and interpreting: An introduction. In A. Ferreira & J. W. Schwieter, eds. *Psycholinguistic and Cognitive Inquiries into Translation and Interpreting*. Amsterdam: John Benjamins Publishing Company, pp. 3–15.
- Flanagan, M. & Christensen, T.P., 2014. Testing post-editing guidelines: how translation trainees interpret them and how to tailor them for translator training purposes. *The Interpreter and Translator Trainer*, 8(2), pp. 257–275.
- Folaron, D., 2010. Translation tools. In Y. Gambier & L. van Doorslaer, eds. *Handbook of Translation Studies. Volume 1*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 429–436.
- Forcada, M.L., 2010. Machine translation today. In Y. Gambier & L. van Doorslaer, eds. *Handbook of Translation Studies. Volume 1*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 215–223.
- Gambier, Y., 2014. Changing Landscape in Translation. *International Journal of Society, Culture & Language*, 2(2), pp. 1–12.
- Garcia, I., 2008. Translating and Revising for Localisation: What do We Know? What do We Need to Know? *Perspectives: Studies in Translatology*, 16(1–2), pp. 49–60.
- Garcia, I., 2009. Beyond Translation Memory: Computers and the Professional Translator. *The Journal of Specialised Translation*, (12), pp. 199–214.
- Garcia, I., 2012. A brief history of postediting and of research on postediting. *Anglo Saxonica*, 3(3), pp. 293–310.
- Garcia, I., 2015. Computer-aided translation: systems. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 68–87.
- Gaspari, F., Almaghout, H. & Doherty, S., 2015. A survey of machine translation competences: insights for translation technology educators and practitioners. *Perspectives: Studies in Translatology*, 23(3), pp. 333–358.
- Geisler, C. & Slattery, S., 2007. Capturing the Activity of Digital Writing: Using, Analyzing, and Supplementing Video Screen Capture. In H. A. McKee & D. DeVoss, eds. *Digital Writing Research: Technologies, Methodologies, and Ethical Issues*. New York: Hampton Press, pp. 185–200.
- Gerloff, P., 1988. *From French to English: a look at the translation process in students, bilinguals, and professional translators*. Unpublished PhD thesis, Harvard University.
- Gibbs, G.R., 2007. *Analyzing Qualitative Data*, London/Thousand Oaks/New Delhi: SAGE Publications.
- Gile, D., 2008. Hypotheses and research questions in empirical TS research. Available at: http://www.est-translationstudies.org/resources/research_issues/hypothandresquest.htm [Accessed October 13, 2016].
- Gile, D., 2016. Experimental research. In C. V. Angelelli & B. J. Baer, eds. *Researching Translation and Interpreting*. New York: Routledge, pp. 220–228.
- Giménez, J. & González, M., 2013. Asiya: An Open Toolkit for Automatic Machine Translation (Meta-)Evaluation. Available at: <http://asiya.cs.upc.edu/demo/> [Accessed January 31, 2017].
- Gold, R.L., 1958. Roles in sociological field observations. *Social Forces*, 36(3), pp. 217–223.
- Green, S., Heer, J. & Manning, C.D., 2013. The Efficacy of Human Post-Editing for Language Translation. In *Proceedings of the 2013 ACM SIGCHI Conference on Human Factors in Computing Systems*. Paris, pp. 439–448.
- Guerberof Arenas, A., 2009. Productivity and quality in the post-editing of outputs from translation memories and machine translation. *Localisation Focus: The International Journal of Localisation*, 7(1), pp. 11–21.
- Guerberof Arenas, A., 2012. *Productivity and quality in the post-editing of outputs from translation memories and machine translation*. PhD thesis, Universitat Rovira i Virgili.

- Guerberof Arenas, A., 2013. What do professional translators think about post-editing? *The Journal of Specialised Translation*, 19, pp. 75–95.
- Guerberof Arenas, A., 2014a. Correlations between productivity and quality when post-editing in a professional context. *Machine Translation*, 28(3–4), pp. 165–186.
- Guerberof Arenas, A., 2014b. The Role of Professional Experience in Post-editing from a Quality and Productivity Perspective. In S. O'Brien et al., eds. *Post-editing of Machine Translation: Processes and Applications*. Newcastle upon Tyne: Cambridge Scholars Publishing, pp. 51–76.
- Guerberof Arenas, A., Depraetere, H. & O'Brien, S., 2012. What we know and what we would like to know about post-editing. *Revista Tradumàtica*, 10, pp. 211–218.
- Göpferich, S., 2008. *Translationsprozessforschung: Stand - Methoden - Perspektiven*, Tübingen: Narr Francke Attempto Verlag.
- Göpferich, S., 2010. Data Documentation and Data Accessibility in Translation Process Research. *The Translator*, 16(1), pp. 93–124.
- Halkier, B., 2008. *Fokusgrupper*, København: Samfundslitteratur.
- Hansen, G., 2005a. Qualitative research in TS - interdisciplinarity + intermethodology. Available at: http://www.est-translationstudies.org/resources/research_issues/qualitative_research_in_TS.html [Accessed October 13, 2016].
- Hansen, G., 2005b. Qualitative and Quantitative Research and Empirical Translation Studies. Available at: http://www.est-translationstudies.org/resources/research_issues/qualitative_and_quantitative_research.html [Accessed January 5, 2017].
- Hansen, G., 2006. Retrospection methods in translator training and translation research. *The Journal of Specialised Translation*, (5), pp. 2–41.
- Hansen, G., 2013a. Many tracks lead to the goal: A long-term study on individual translation styles. In C. Way et al., eds. *Tracks and Treks in Translation Studies*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 49–62.
- Hansen, G., 2013b. The translation process as object of research. In C. Millán & F. Bartrina, eds. *The Routledge Handbook of Translation Studies*. Oxford/New York: Routledge, pp. 88–101.
- Heath, C., Knoblauch, H. & Luff, P., 2000. Technology and social interaction: the emergence of “workplace studies.” *British Journal of Sociology*, 51(2), pp. 299–320.
- Heyn, M., 1998. Translation Memories: Insights and Prospects. In L. Bowker et al., eds. *Unity in Diversity? Current Trends in Translation Studies*. Manchester: St. Jerome Publishing, pp. 123–136.
- Holmes, J.S., 1988. The Name and Nature of Translation Studies. In J. S. Holmes, ed. *Translated! Papers on Literary Translation and Translation Studies*. Amsterdam: Rodopi, pp. 67–80.
- Holmes, J.S., 2000. The Name and Nature of Translation Studies. In L. Venuti, ed. *The Translation Studies Reader*. New York/London: Routledge, pp. 172–185.
- Howe, K.R., 1988. Against the Quantitative-Qualitative Incompatibility Thesis or Dogmas Die Hard. *Educational Researcher*, 17(8), pp. 10–16.
- Hubscher-Davidson, S., 2011. A discussion of ethnographic research methods and their relevance for translation process research. *Across Languages and Cultures*, 12(1), pp. 1–18.
- Hutchins, E., 2001. Distributed Cognition. In *International Encyclopedia of the Social & Behavioral Sciences*. Amsterdam/New York: Elsevier, pp. 2068–2072.
- Hutchins, J., 1998. The Origins of the Translator's Workstation. *Machine Translation*, 13(4), pp. 287–307.
- Hutchins, J., 2005. The history of machine translation in a nutshell. Available at:

- <http://www.hutchinsweb.me.uk/Nutshell-2005.pdf> [Accessed February 2, 2017].
- Hutchins, J., 2010. Machine Translation: A Concise History. *Journal of Translation Studies*, 13(1 & 2), pp. 29–70.
- Hutchins, W.J., 2015. Machine translation: History of research and applications. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 120–136.
- Hutchins, W.J. & Somers, H.L., 1992. *An introduction to machine translation*, London: Academic Press.
- Jakobsen, A.L., 2002. Translation drafting by professional translators and by translation students. In G. Hansen, ed. *Empirical Translation Studies: Process and Product*. Copenhagen: Samfundslitteratur, pp. 191–204.
- Jakobsen, A.L., 2003. Effects of think aloud on translation speed, revision, and segmentation. In F. Alves, ed. *Triangulating translation: perspectives in process oriented research*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 69–95.
- Jakobsen, A.L., 2005. Investigating Expert Translators' Processing Knowledge. In H. V. Dam, J. Engberg, & H. Gerzymisch-Arbogast, eds. *Knowledge Systems and Translation*. Berlin: Mouton de Gruyter, pp. 173–189.
- Jakobsen, A.L., 2011. Tracking translators' keystrokes and eye movements with Translog. In C. Alvstad, A. Hild, & E. Tiselius, eds. *Methods and Strategies of Process Research: Integrative approaches in Translation Studies*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 37–55.
- Jakobsen, A.L., 2014. The development and current state of translation process research. In E. Brems, R. Meylaerts, & L. van Doorslaer, eds. *The Known Unknowns of Translation Studies*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 65–88.
- Jensen, M.N., 2013. *Translators of Patient Information Leaflets: Translation experts or expert translators?* PhD thesis, Aarhus University.
- Jiménez-Crespo, M.A., 2015. The Internet in translation education: Two decades later. *Translation and Interpreting Studies*, 10(1), pp. 33–57.
- Johnson, P., 1992. *Human-computer interaction: psychology, task analysis and software engineering*, London: McGraw Hill.
- Just, M.A. & Carpenter, P.A., 1980. A Theory of Reading: From Eye Fixations to Comprehension. *Psychological Review*, 87(4), pp. 329–354.
- Jääskeläinen, R., 2010. Think-aloud protocol. In Y. Gambier & L. van Doorslaer, eds. *Handbook of Translation Studies. Volume 1*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 371–373.
- Jääskeläinen, R., 2011. Studying the Translation Process. In K. Malmkjær & K. Windle, eds. *The Oxford Handbook of Translation Studies*. Oxford: Oxford University Press, pp. 123–135.
- Karamanis, N., Luz, S. & Doherty, G., 2010. Translation practice in the workplace and Machine Translation. In *Proceedings of the 14th Conference of the European Association for Machine Translation (EAMT'10)*. St. Raphaël, pp. 245–252.
- Karamanis, N., Luz, S. & Doherty, G., 2011. Translation practice in the workplace: contextual analysis and implications for machine translation. *Machine Translation*, 25(1), pp. 35–52.
- Kay, M., 1980. *The Proper Place of Men and Machines in Language Translation*, Palo Alto.
- Kemper, E.A., Stringfield, S. & Teddlie, C., 2003. Mixed methods sampling strategies in social science research. In A. Tashakkori & C. Teddlie, eds. *Handbook of mixed methods in social and behavioral research*. Thousand Oaks/London/New Delhi: SAGE Publications, pp. 273–296.
- Kenny, D., 2011. Electronic tools and resources for translators. In K. Malmkjær & K. Windle, eds. *The Oxford Handbook of Translation Studies*. Oxford: Oxford University Press, pp.

- 455–472.
- King, N., 1998. Template Analysis. In G. Symon & C. Cassell, eds. *Qualitative Methods and Analysis in Organizational Research*. London: SAGE Publications, pp. 118–134.
- King, N., 2004. Using Templates in the Thematic Analysis of Text. In C. Cassell & G. Symon, eds. *Essential Guide to Qualitative Methods in Organizational Research*. London: SAGE Publications, pp. 256–270.
- King, N., 2012. Doing Template Analysis. In G. Symon & C. Cassell, eds. *Qualitative Organizational Research*. London: SAGE Publications, pp. 426–450.
- Kingscott, G., 2002. Technical translation and related disciplines. *Perspectives: Studies in Translatology*, 10(4), pp. 247–255.
- Kit, C. & Tak-ming, B.W., 2015. Evaluation in machine translation and computer-aided translation. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 213–236.
- Koponen, M., 2012. Comparing human perceptions of post-editing effort with post-editing operations. In *Proceedings of the 7th Workshop on Statistical Machine Translation*. Montreal, pp. 181–190.
- Koponen, M. et al., 2012. Post-editing time as a measure of cognitive effort. In *Proceedings of the AMTA 2012 Workshop on Post-editing Technology and Practice*. San Diego, pp. 11–20.
- Koskinen, K., 2008. *Translating Institutions: An Ethnographic Study of EU Translation*, Manchester: St. Jerome Publishing.
- Krings, H.P., 1986. *Was in den Köpfen von Übersetzern vorgeht: eine empirische Untersuchung zur Struktur des Übersetzungsprozesses an fortgeschrittenen Französischlernern*, Tübingen: Gunter Narr Verlag.
- Krings, H.P., 2001. *Repairing texts: empirical investigations of machine translation post-editing processes*, Kent: Kent State University Press.
- Krings, H.P., 2005. Wege ins Labyrinth – Fragestellungen und Methoden der Übersetzungsprozessforschung im Überblick. *Meta: Journal des traducteurs*, 50(2), pp. 342–358.
- Krüger, R., 2016. Contextualising Computer-Assisted Translation Tools and Modelling Their Usability. *trans-kom*, 9(1), pp. 114–148.
- Kvale, S. & Brinkmann, S., 2009a. *Interview: Introduktion til et håndværk 2. udgave.*, Copenhagen: Hans Reitzel.
- Kvale, S. & Brinkmann, S., 2009b. *InterViews: Learning the Craft of Qualitative Research Interviewing*, Thousand Oaks/London/New Delhi: SAGE Publications.
- Lacruz, I., Denkowski, M. & Lavie, A., 2014. Cognitive Demand and Cognitive Effort in Post-Editing. In *Proceedings of the Third Workshop on Post-Editing Technology and Practice*. Vancouver, pp. 73–84.
- Lacruz, I., Shreve, G.M. & Angelone, E., 2012. Average Pause Ratio as an Indicator of Cognitive Effort in Post-Editing: A Case Study. In *AMTA 2012 Workshop on Post-Editing Technology and Practice (WPTP 2012)*. San Diego, pp. 21–30.
- Lagoudaki, E., 2008. The Value of Machine Translation for the Professional Translator. In *8th Association of Machine Translation in the Americas Conference*. Hawaii, pp. 262–269.
- Lange, C.A. & Bennett, W.S., 2000. Combining Machine Translation with Translation Memory at Baan. In R. C. Sprung & S. Jaroniec, eds. *Translating Into Success: Cutting-edge strategies for going multilingual in a global age*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 203–218.
- LeBlanc, M., 2013. Translators on translation memory (TM). Results of an ethnographic study in three translation services and agencies. *Translation and Interpreting*, 5(2), pp. 1–13.
- LeBlanc, M., 2017. “I can’t get no satisfaction!” Should we blame translation technologies or

- shifting business practices? In D. Kenny, ed. *Human Issues in Translation Technology*. London/New York: Routledge, pp. 45–62.
- Leijten, M. & Van Waes, L., 2006. Inputlog: New Perspectives on the Logging of On-Line Writing Processes in a Windows Environment. In K. P. H. Sullivan & E. Lindgren, eds. *Studies in Writing: Vol. 18. Computer Key-Stroke Logging and Writing: Methods and Applications*. Oxford: Elsevier, pp. 73–94.
- Leijten, M. & Van Waes, L., 2013. Keystroke Logging in Writing Research: Using Inputlog to Analyze and Visualize Writing Processes. *Written Communication*, 30(3), pp. 358–392.
- Liu, Q. & Zhang, X., 2015. Machine translation: general. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 105–119.
- Luff, P., Hindmarsh, J. & Heath, C., 2000. Introduction. In P. Luff, J. Hindmarsh, & C. Heath, eds. *Workplace Studies: Recovering Work Practice and Informing System Design*. Cambridge: Cambridge University Press, pp. 1–26.
- Läubli, S. et al., 2013. Assessing Post-Editing Efficiency in a Realistic Translation Environment. In *Proceedings of MT Summit XIV Workshop on Post-editing Technology and Practice*. Allschwil, pp. 83–91.
- Lörscher, W., 1991. *Translation performance, translation process, and translation strategies. A psycholinguistic investigation*, Tübingen: Gunter Narr Verlag.
- Marshman, E., 2012. In the driver's seat: Perceptions of control as indicators of language professionals' satisfaction with technologies in the workplace. In *Proceedings of the Aslib Translating and the Computer Conference*. London. Available at: <http://www.mt-archive.info/Aslib-2012-Marshman.pdf>.
- Melby, A.K., 1981a. Translators and Machines - Can they cooperate? *Meta: Journal des traducteurs*, 26(1), pp. 23–34.
- Melby, A.K., 1981b. A Bilingual Concordance System and its Use in Linguistic Studies. In W. Gutwinski & G. Jolly, eds. *The Eighth LACUS Forum 1981*. Columbia, SC: Hornbeam Press, pp. 541–549.
- Melby, A.K., 1982. Multi-Level Translation Aids in a Distributed System. In J. Horecky, ed. *COLING 82: Proceedings of the Ninth International Conference on Computational Linguistics*. Amsterdam/New York/Oxford: North-Holland Publishing Company, pp. 215–220.
- Melby, A.K., 1984. Machine Translation with Post Editing versus A Three-Level Integrated Translator Aid System. *Terminology Bulletin*, 45, pp. 47–55.
- Melby, A.K., 1987. On human-machine interaction in translation. In S. Nirenburg, ed. *Machine Translation: Theoretical and methodological issues*. Cambridge/New York/Melbourne: Cambridge University Press, pp. 145–154.
- Melby, A.K., Lommel, A. & Vázquez, L.M., 2015. Bitext. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 409–424.
- Melby, A.K. & Wright, S.E., 2015. Translation memory. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 662–677.
- Mellinger, C.D. & Hanson, T.A., 2017. *Quantitative Research Methods in Translation and Interpreting Studies*, Oxford/New York: Routledge.
- Mesa-Lao, B., 2011. Explication in translation memory-mediated environments. Methodological conclusions from a pilot study. *The International Journal for Translation & Interpreting Research*, 3(1), pp. 44–57.
- Mesa-Lao, B., 2015. *Post-editing of Machine Translation*, Copenhagen: Center for Research and Innovation in Translation and Translation Technology, Copenhagen Business School.
- Mesa-Lao, B., Schaeffer, M. & Carl, M., 2014. Human and Automatic Evaluation of Machine Translation: Correlating Post-Editing Changes and Translation Edit Rate Scores. In W. Baur et al., eds. *Man vs. Machine? Proceedings of the XXth FIT World Congress*. Berlin,

- pp. 120–130.
- Monk, A. & Gilbert, N., 1995. Inter-disciplinary research. In A. Monk & N. Gilbert, eds. *Perspectives on HCI: Diverse Approaches*. London: Academic Press, pp. 1–8.
- Moorkens, J. & O'Brien, S., 2013. User Attitudes to the Post-Editing Interface. In *Proceedings of MT Summit XIV Workshop on Post-editing Technology and Practice*. Nice, pp. 19–25.
- Moran, J., Lewis, D. & Saam, C., 2014. Analysis of Post-Editing Data: A Productivity Field Test using an Instrumented CAT Tool. In S. O'Brien et al., eds. *Post-editing of Machine Translation: Processes and Applications*. Newcastle upon Tyne: Cambridge Scholars Publishing, pp. 126–146.
- Moran, J., Saam, C. & Lewis, D., 2014. Towards desktop-based CAT tool instrumentation. In *Proceedings of the Third Workshop on Post-Editing Technology and Practice. The 11th Conference of the Association for Machine Translation in the Americas*. Vancouver, pp. 99–112.
- 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.
- Mossop, B., 2007a. Empirical studies of revision: what we know and need to know. *The Journal of Specialised Translation*, (8), pp. 5–20.
- Mossop, B., 2007b. *Revising and Editing for Translators* 2nd ed., Manchester: St. Jerome Publishing.
- Mossop, B., 2014. *Revising and Editing for Translators* 3rd ed., London/New York: Routledge.
- Munday, J., 2009. Issues in translation studies. In J. Munday, ed. *The Routledge Companion to Translation Studies*. Oxford and New York: Routledge, pp. 1–19.
- Munday, J., 2016. *Introducing Translation Studies: Theories and Applications* 4th ed., London/New York: Routledge.
- Muñoz Martín, R., 2010a. Leave no stone unturned: On the development of cognitive translatology. *Translation and Interpreting Studies*, 5(2), pp. 145–162.
- Muñoz Martín, R., 2010b. On paradigms and cognitive translatology. In G. M. Shreve & E. Angelone, eds. *Translation and Cognition*. Amsterdam: John Benjamins, pp. 169–187.
- Muñoz Martín, R., 2012. Standardizing translation process research methods and reports. In I. García-Izquierdo & E. Monzó, eds. *Iberian Studies on Translation and Interpreting*. Oxford/New York: Peter Lang, pp. 11–22.
- Muñoz Martín, R., 2014. A blurred snapshot of advances in translation process research. In R. M. Martín, ed. *Minding Translation - MonTI Special Issue 1*. pp. 49–84.
- Noldus, 2013. uLog. Available at: <http://www.noldus.com/human-behavior-research/products/ulog>.
- Norman, D.A., 1991. Cognitive Artifacts. In J. M. Carroll, ed. *Designing Interaction: Psychology at the Human-Computer Interface*. Cambridge: Cambridge University Press, pp. 17–38.
- Norman, D.A., 2009. Systems Thinking: A Product Is More Than the Product. *interactions*, 16(5), pp. 52–54.
- 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., 2007. Eye-Tracking and Translation Memory Matches. *Perspectives: Studies in Translatology*, 14(3), pp. 185–205.
- O'Brien, S., 2008. Processing fuzzy matches in translation memory tools: an eye-tracking analysis. In S. Göpferich, A. L. Jakobsen, & I. M. Mees, eds. *Looking at eyes. Eye-tracking studies of reading and translation processing*. Copenhagen: Samfundslitteratur, pp. 79–102.
- O'Brien, S., 2009. Eye tracking in translation process research: methodological challenges and solutions. In I. M. Mees, F. Alves, & S. Göpferich, eds. *Methodology, Technology*

- and Innovation in Translation Process Research: A Tribute to Arnt Lykke Jakobsen.* København: Samfundslitteratur, pp. 251–266.
- O'Brien, S., 2011. Towards predicting post-editing productivity. *Machine Translation*, 25(3), pp. 197–215.
- O'Brien, S., 2012. Translation as human–computer interaction. *Translation Spaces*, 1(1), pp. 101–122.
- O'Brien, S., 2013. The borrowers: Researching the cognitive aspects of translation. *Target*, 25(1), pp. 5–17.
- O'Brien, S., 2016a. Keynote speech at EST Congress 2016: Shifting Paradigms in Translation Technology and their Impact on Translation (Studies).
- O'Brien, S., 2016b. Post-Editing and CAT. *EST Newsletter No. 48*, p.10.
- O'Brien, S. & Moorkens, J., 2014. Towards Intelligent Post-Editing Interfaces. In *Man vs Machine?. Vol. I : The Future of Translators, interpreters and terminologists: Proceedings of the XXth FIT World Congress*. Berlin, pp. 131–137.
- O'Brien, S., O'Hagan, M. & Flanagan, M., 2010. Keeping an eye on the UI design of Translation Memory: How do translators use the “Concordance” feature? In *European Conference on Cognitive Ergonomics*. Delft, pp. 1–4.
- O'Brien, S. & Teixeira, C., 2016a. Presentation at EST Congress 2016: Recent advances in translation tools from a cognitive ergonomics perspective.
- O'Brien, S. & Teixeira, C., 2016b. Presentation at the 5th Translation Process Research Workshop: Investigating the cognitive ergonomic aspects of translation tools in a workplace setting.
- O'Hagan, M., 2009. Computer-aided translation (CAT). In M. Baker & G. Saldanha, eds. *Routledge Encyclopedia of Translation Studies*. London/New York: Routledge, pp. 48–51.
- O'Hagan, M., 2013. The impact on new technologies on translation studies: A technological turn? In C. Millán & F. Bartrina, eds. *The Routledge Handbook of Translation Studies*. Oxford/New York: Routledge, pp. 503–518.
- Oates, B.J., 2006. *Researching Information Systems and Computing*, London/Thousand Oaks/New Delhi: SAGE Publications.
- Olohan, M., 2011. Translators and translation technology: The dance of agency. *Translation Studies*, 4(3), pp. 342–357.
- Onwuegbuzie, A.J. & Leech, N.L., 2005. Taking the “Q” Out of Research: Teaching Research Methodology Courses Without the Divide Between Quantitative and Qualitative Paradigms. *Quality and Quantity*, 39, pp. 267–296.
- Pickering, A., 2005. *The Mangle of Practice: Time, Agency, and Science*, Chicago/London: The University of Chicago Press.
- Plitt, M. & Masselot, F., 2010. A Productivity Test of Statistical Machine Translation Post-Editing in a Typical Localisation Context. *The Prague Bulletin of Mathematical Linguistics*, 93, pp. 7–16.
- Pym, A., 2011a. Democratizing translation technologies: The role of humanistic research. Paper presented to the Luspio Translation Automation Conference, Rome, April 5 2011. Available at: http://usuaris.tinet.cat/apym/online/research_methods/2011_rome_formatted.pdf [Accessed February 2, 2017].
- Pym, A., 2011b. What technology does to translating. *Translation and Interpreting*, 3(1), pp.1–9.
- Pym, A., 2013. Translation Skill-Sets in a Machine-Translation Age. *Meta: Journal des traducteurs*, 58(3), pp. 487–503.
- QSR International, 2017. NVivo. Available at: <http://www.qsrinternational.com/product> [Accessed January 31, 2017].
- Rasmussen, K.W. & Schjoldager, A., 2011. Revising Translations: A Survey of Revision Policies

- in Danish Translation Companies. *The Journal of Specialised Translation*, (15), pp. 87–120.
- Reinke, U., 2013. State of the Art in Translation Memory Technology. *Translation: Computation, Corpora, Cognition*, 3(1), pp. 27–48.
- Reiss, K. & Vermeer, H.J., 1984. *Grundlegung einer allgemeinen Translationstheorie*, Tübingen: Niemeyer.
- Rinsche, A. & Portera-Zanotti, N., 2009. *Studies on translation and multilingualism: The size of the language industry in the EU. Study report to the Directorate General for Translation of the European Commission*, Surrey: The Language Technology Centre Ltd.
- Risku, H., 2007. The role of technology in translation management. In Y. Gambier, M. Shlesinger, & R. Stolze, eds. *Doubts and Directions in Translation Studies*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 85–97.
- Risku, H., 2010. A cognitive scientific view on technical communication and translation: Do embodiment and situatedness really make a difference? *Target*, 22(1), pp. 94–111.
- Risku, H., 2013. Cognitive Approaches to Translation. In C. A. Chapelle, ed. *The Encyclopedia of Applied Linguistics*. Chichester: Blackwell Publishing, pp. 1–10.
- Risku, H., 2014a. The leaky translation process: New perspectives in cognitive translation studies - Keynote speech delivered at The ARTIS Inaugural Symposium, May 13, 2014. Available at: <http://artisinitiative.org/resources/cognitive-approaches/>.
- Risku, H., 2014b. Translation process research as interaction research: From mental to socio-cognitive processes. In R. M. Martín, ed. *Minding Translation - MonTI Special Issue 1*. pp. 331–353.
- Risku, H., Rossmanith, N., et al., 2013. Translation in the network economy: A follow-up study. In C. Way et al., eds. *Tracks and Treks in Translation Studies*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 29–48.
- Risku, H. & Windhager, F., 2013. Extended Translation: A Sociocognitive Research Agenda. *Target*, 25(1), pp. 34–46.
- Risku, H., Windhager, F. & Apfelthaler, M., 2013. A dynamic network model of translatorial cognition and action. *Translation Spaces*, 2, pp. 151–182.
- Robert, I., 2013. Translation revision: Does the revision procedure matter? In C. Way et al., eds. *Tracks and Treks in Translation Studies*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 87–102.
- Saldanha, G. & O'Brien, S., 2013. *Research Methodologies in Translation Studies*, Manchester: St. Jerome Publishing.
- Sanchis-Trilles, G. et al., 2014. Interactive translation prediction versus conventional post-editing in practice: a study with the CasMaCat workbench. *Machine Translation*, 28(3), pp. 217–235.
- Schjoldager, A., 2010. Microstrategies. In A. Schjoldager, H. Gottlieb, & I. Klitgård, eds. *Understanding Translation*. Aarhus: Academica, pp. 89–112.
- Schmitt, P.A., 2015. Who is afraid of MT? *Lebende Sprachen*, 60(2), pp. 234–258.
- Schubert, K., 2009. Positioning Translation in Technical Communication Studies. *The Journal of Specialised Translation*, (11), pp. 17–30.
- Screen, B.A., 2016. What does Translation Memory do to translation? The effect of Translation Memory output on specific aspects of the translation process. *Translation and Interpreting*, 8(1), pp. 1–18.
- SDL, 2016. Translation Memory Penalties. Available at: http://producthelp.sdl.com/sdl-trados-studio/client_en/Introducing/About_Translation_Memory/inabouttmtranslationmemorypenalties.htm [Accessed March 9, 2016].
- SDL AppStore, 2016. SDLXLIFF Compare. Available at: <http://appstore.sdl.com/app/sdlxliff-compare/89/> [Accessed November 16, 2016].

- Séguinot, C., 2000. Management Issues in the Translation Process. In S. Tirkkonen-Condit & R. Jääskeläinen, eds. *Tapping and Mapping the Processes of Translation and Interpreting: Outlooks on Empirical Research*. Amsterdam/Philadelphia: John Benjamins Publishing Company, pp. 143–148.
- Silva, R., 2014. Integrating Post-Editing MT in a Professional Translation Workflow. In S. O'Brien et al., eds. *Post-editing of Machine Translation: Processes and Applications*. Newcastle upon Tyne: Cambridge Scholars Publishing, pp. 24–50.
- Sin-wai, C., 2015. Computer-aided translation: major concepts. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 32–67.
- Skadiņš, R. et al., 2011. Evaluation of SMT in localization to under-resourced inflected language. In M. L. Forcada, H. Depraetere, & V. Vandeghinste, eds. *Proceedings of the 15th Conference of the European Association for Machine Translation*. Leuven: European Association for Machine Translation, pp. 35–40.
- Snell-Hornby, M., 2006. *Turns of Translation Studies: New paradigms or shifting viewpoints?*, Philadelphia: John Benjamins Publishing Company.
- Snell-Hornby, M., Pöchhacker, F. & Kaindl, K., 1994. Preface. In M. Snell-Hornby, F. Pöchhacker, & K. Kaindl, eds. *Translation Studies: An Interdiscipline*. Amsterdam/Philadelphia: John Benjamins Publishing Company, p. ix.
- Snover, M. et al., 2006. A Study of Translation Edit Rate with Targeted Human Annotation. In *Proceedings of the 7th Conference of the Association for Machine Translation in the Americas*. Cambridge, pp. 223–231.
- Snover, M. et al., 2009. Fluency, Adequacy, or HTER? Exploring Different Human Judgments with a Tunable MT Metric. In *Proceedings of the Fourth Workshop on Statistical Machine Translation*. Athens, pp. 259–268.
- Somers, H., 2011. Machine translation: History, development, and limitations. In K. Malmkjær & K. Windle, eds. *The Oxford Handbook of Translation Studies*. Oxford: Oxford University Press, pp. 427–440.
- Specia, L., 2012. Review of Kirsten Malmkjær and Kevin Windle (eds.): The Oxford handbook of translation studies. *Machine Translation*, pp. 1–5.
- Specia, L. et al., 2009. Improving the Confidence of Machine Translation Quality Estimates. In *Proceedings of the Twelfth Machine Translation Summit*. Ottawa, pp. 136–143.
- Spelman Miller, K. & Sullivan, K.P.H., 2006. Keystroke Logging: An Introduction. In K. P. H. Sullivan & E. Lindgren, eds. *Computer Keystroke Logging and Writing: Methods and Applications*. Oxford: Elsevier, pp. 1–9.
- Stein, D., 2013. Machine Translation: Past, Present and Future. *Translation: Computation, Corpora, Cognition*, 3(1), pp. V–XIII.
- Tashakkori, A. & Teddlie, C., 2003. *Handbook of mixed methods in social and behavioral research*, Thousand Oaks/London/New Delhi: SAGE Publications.
- Tatsumi, M., 2010. *Post-Editing Machine Translated Text in A Commercial Setting: Observation and Statistical Analysis*. Dublin City University.
- TAUS, 2013. TAUS Best Practice Guidelines Pricing MT Post-Editing. Available at: https://www.taus.net/index.php?option=com_rsfiles&layout=preview&tmpl=component&path=Articles%2FFinal-TAUS-PricingMTPE-Guidelines-September2013.pdf [Accessed February 2, 2017].
- Teddlie, C. & Tashakkori, A., 2009. *Foundations of Mixed Methods Research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*, Los Angeles/London/New Delhi/Singapore/Washington DC: SAGE Publications.
- Teddlie, C. & Tashakkori, A., 2011. Mixed Methods Research: Contemporary Issues in an Emerging Field. In N. K. Denzin & Y. S. Lincoln, eds. *The SAGE Handbook of Qualitative Research*. Los Angeles/London/New Delhi/Singapore/Washington DC: SAGE

- Publications, pp. 285–299.
- Teixeira, C., 2011. Knowledge of Provenance and its Effects on Translation Performance in an Integrated TM/MT Environment. In B. Sharp et al., eds. *Proceedings of the 8th International NLPCS Workshop - Special theme: Human-Machine Interaction in Translation*. Copenhagen: Samfundslitteratur, pp. 107–118.
- Teixeira, C., 2013. Multilingual Systems, Translation Technology and Their Impact on the Translator's Profession. In A. Neustein & J. A. Markowitz, eds. *Where Humans Meet Machines: Innovative Solutions for Knotty Natural-Language Problems*. New York: Springer-Verlag, pp. 299–314.
- Teixeira, C., 2014a. Perceived vs. measured performance in the post-editing of suggestions from machine translation and translation memories. In *Proceedings of the Third Workshop on Post-Editing Technology and Practice*. Vancouver, pp. 45–59.
- Teixeira, C., 2014b. *The Impact of Metadata on Translator Performance: How Translators Work With Translation Memories and Machine Translation*. PhD thesis, Universitat Rovira i Virgili and Katholieke Universiteit Leuven.
- Ten Have, P., 2004. *Understanding Qualitative Research and Ethnomethodology*, London: SAGE Publications.
- Thang, L., Cho, K. & Manning, C., 2016. Neural Machine Translation - Tutorial ACL 2016. Available at: <https://sites.google.com/site/acl16nmt/> [Accessed September 30, 2016].
- The International Organization for Standardization, 2015. *ISO 17100:2015: Translation services - Requirements for translation services*.
- Torres-Hostench, O. et al., 2010. TRACE: Measuring the Impact of CAT Tools on Translated Texts. In M. L. Gea-Valor, I. García-Izquierdo, & M.-J. Esteve, eds. *Linguistic and Translation Studies in Scientific Communication*. Bern: Peter Lang, pp. 255–276.
- Toury, G., 2012. *Descriptive Translation Studies - and beyond*, Amsterdam/Philadelphia: John Benjamins Publishing Company.
- Valli, P., 2014. Pulling strings: Concordance searches as manifestations of translation problems. *Translation and Interpreting Studies*, 9(1), pp. 52–69.
- Vandepitte, S., 2008. Remapping Translation Studies: Towards a Translation Studies Ontology. *Meta: Journal des traducteurs*, 53(3), pp. 569–588.
- Vázquez, L.M., 2012. *An empirical study on the influence of translation suggestions' provenance metadata*. PhD thesis, University of Limerick.
- Vermeer, H.J., 1978. Ein Rahmen für eine allgemeine Translationstheorie. *Lebende Sprachen*, 23, pp. 99–102.
- Warburton, K., 2015. Terminology management. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 644–661.
- Waring, T. & Wainwright, D., 2008. Issues and Challenges in the Use of Template Analysis: Two Comparative Case Studies from the Field. *The Electronic Journal of Business Research Methods*, 6(1), pp. 85–94.
- Wilson, M., 2002. Six views of embodied cognition. *Psychonomic Bulletin & Review*, 9(4), pp. 625–636.
- Wilss, W., 2004. Translation Studies – The State of the Art. *Meta: Journal des traducteurs*, 49(4), pp. 777–785.
- Wong, C.S.M., 2015. The teaching of machine translation: The Chinese University of Hong Kong as a case study. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 237–251.
- WritingPro, 2013. Logging Programs. Available at: http://www.writingpro.eu/logging_programs.php.
- Yamada, M., 2011. *Revising text: An empirical investigation of revision and the effects of integrating a TM and MT system into the translation process*. PhD thesis, Rikkyo University.

- Yu, S. & Bai, X., 2015. Rule-based machine translation. In C. Sin-wai, ed. *The Routledge Encyclopedia of Translation Technology*. London/New York: Routledge, pp. 186–200.
- Zapata, J., 2016. Investigating Translator-Information Interaction: A Case Study on the Use of the Prototype Biconcordancer Tool Integrated in CASMACAT. In M. Carl, S. Bangalore, & M. Schaeffer, eds. *New Directions in Empirical Translation Process Research: Exploring the CRITT TPR-DB*. Cham: Springer, pp. 135–152.
- Zetzsche, J., 2014. *The Translator's Tool Box - A Computer Primer for Translators*, International Writers' Group.
- Zetzsche, J., 2016. Lilt: Translation environment tool of a different kind. *MultiLingual* 157, pp. 15–17.

APPENDICES

Appendix 1. Source text and matches – FAQ text

Segment number	Match type	Source text segment	Match
1	100%	8785 (5553)	8785 (5553)
2	MT	When I set up BeoLab 14 , should I use PL-A (PL1) or PL-B (PL-2)?	Når jeg BeoLab 14 , skal jeg anvende PL-A (PL1) eller PL-B (PL-2)?
3	MT	Which MODE setting to use depends on the type of your Bang & Olufsen television.	Hvilken TILSTAND indstilling afhænger af dit Bang & Olufsen fjernsyn.
4	MT	See below table to find out which MODE setting to use:	Se tabellen nedenfor for at finde ud af, hvilken TILSTAND indstilling:
5	MT	PL- A (PL1)	PL- (PL1)
6	MT	PL-B (PL2)	PL-B (PL2)
7	100%	BeoVision 11	BeoVision 11
8	100%	BeoPlay V1	BeoPlay V1
9	MT	TVs with RJ45 Power Link sockets:	Fjernsyn med RJ45- Power Link stik:
10	100%	BeoVision 10-32/40/46	BeoVision 10-32/40/46
11	100%	BeoVision 8-26/32/40	BeoVision 8-26/32/40
12	99%	BeoVision 7-40/55	BeoVision 7-40/55.
13	100%	BeoVision 9	BeoVision 9
14	MT	TVs with Din Power Link sockets:	Fjernsyn med DIN Power Link stik:
15	MT	<i>Note that 'BeoLab 14' may not be available in the SPEAKER TYPE menu.</i>	<i>Bemærk, at 'BeoLab 14' ikke er tilgængelig i SPEAKER TYPE menu.</i>
16	91%	<i>See the Quick guide for more information.</i>	<i>Se yderligere oplysninger i onlinevejledningen.</i>
17	100%	---	---
18	100%	8786 (5554)	8786 (5554)
19	71%	How do I adjust the sound settings on my BeoLab 14 ?	Hvordan ændrer jeg indstillingerne på Beolit 14?
20	72%	See the Quick guide enclosed with your BeoLab 14 .	Se yderligere oplysninger i den vejledning, der fulgte med NAS-serveren.
21	MT	For information about more advanced sound settings, see the Technical Sound Guide .	Se oplysninger om mere avancerede lydindstillinger, se Tekniske lyd Vejledning .
22	100%	8787 (5555)	8787 (5555)
23	MT	How should I set the bass position knob (FREE , WALL , CORNER) on BeoLab 14 ?	Hvordan skal jeg indstille bass positionsknappen (FRI , WALL , HJØRNE) på BeoLab 14 ?
24	79%	The setting of the bass position knob is based on the number of surfaces the subwoofer is in close proximity of.	Indstillingen af omskifteren POS. afhænger af det antal overflader, som subwooferen står i nærheden af (inden for 50 cm).
25	98%	Use the position knob to filter out the natural bass change obtained if the subwoofer is placed, for example, in a corner, as compared to a more freestanding position.	Brug positionsomskifteren til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.
26	94%	FREE:	FREE

27	100%	Use this setting if the subwoofer is close to one surface (freestanding in a room or on a wall).	Brug denne indstilling, hvis subwooferen er placeret tæt på én overflade: fritstående (gulvet) eller hængende på en væg.
28	100%	Shown by light grey areas in the illustration.	Dette viser de lysegrå områder i illustrationen ovenfor.
29	94%	WALL:	WALL
30	100%	Use this setting if the subwoofer is placed close to two surfaces (placed on the floor close to a wall).	Brug denne indstilling, hvis subwooferen er placeret tæt på to overflader: på gulvet og tæt på en væg.
31	100%	Shown by medium grey areas in the illustration.	Dette viser de mellemgrå områder i illustrationen ovenfor.
32	94%	CORNER:	CORNER
33	100%	Use this setting if the subwoofer is placed close to three surfaces (in a corner).	Brug denne indstilling, hvis subwooferen er placeret tæt på tre overflader: på gulvet og i et hjørne.
34	99%	Shown by the dark grey areas in the illustration.	Det er vist med de mørkegrå områder i illustrationen ovenfor.
35	95%	The positions mentioned are guidelines only.	Disse positionsindstillinger er dog kun anbefalinger –
36	75%	You may set the position knob to any position depending on your sound preference.	du kan frit indstille omskifteren, som du foretrækker.
37	MT	For more details, see the Technical Sound Guide .	Yderligere oplysninger findes i teknisk viden Vejledning .
38	100%	8788 (5556)	8788 (5556)
39	MT	Why does my BeoLab 14 not switch to standby after 3 minutes with no sound, when the MODE switch is set to LINE or AMP?	Hvorfor bliver min BeoLab 14 ikke omskifter til standby efter 3 minutter uden lyd, når tilstanden omskifter er indstillet til Line eller AMP ?
40	MT	If the noise on the LINE or AMP signal is too high, the BeoLab 14 will detect this as sound and not switch off.	Hvis støj på Line eller AMP signal er for høj, BeoLab 14 bliver det registreret som lyd og ikke omskifter fra.
41	MT	To avoid noise on the LINE or AMP signal make sure that you have connected all sockets on BeoLab 14 to the corresponding sockets on the connected product.	For at undgå støj på Line eller AMP signal make sure that you have connected all sockets on BeoLab 14 to the corresponding sockets on the connected product.
42	MT	See below picture or the Quick guide for more information.[tag]	Se nedenstående billede eller den korte Vejledning for at få yderligere oplysninger. [tag]
43	MT	MODE switch set to AMP	TILSTAND omskifter indstillet til AMP
44	MT	MODE switch set to LINE	TILSTAND omskifter indstillet til Line
45	100%	8790 (5558)	8790 (5558)
46	92%	What does the indicator light on BeoLab 14 mean?	Hvad betyder lamperne på BeoLab 14?
47	100%	Indicator light	Indikatorlampe
48	100%	Flashing	Blinker
49	CM	Solid	Lyser konstant
50	100%	Green	Grøn
51	70%	[tag]A software update in progress:	En optagelse er i gang
52	MT	Do not disconnect BeoLab 14 from the mains during the software update.	Afbryd ikke BeoLab 14 fra lysnet under softwareopdatering.
53	100%	Note:	Bemærk!


54	MT	<i>A software update must always be performed by an authorised Bang & Olufsen retailer or service technician.</i>	<i>En softwareopdatering skal altid udføres af en autoriseret Bang & Olufsen forhandler eller tjeneste tekniker.</i>
55	MT	[tag]Switched on (10 seconds duration)	Tændt (10 sekunder varighed)
56	100%	Red	Rød
57	100%	n/a*	Ikke relevant*
58	MT	[tag] Switched off (10 seconds duration)	Slukket (10 sekunder varighed)
59	100%	Orange	Orange
60	MT	[tag]Product failure:	Produktfejl:
61	MT	Disconnect BeoLab 14 from the mains, then reconnect it to the main again.	Afbryd BeoLab 14 fra lysnet, og sæt den i igen.
62	88%	If this does not solve the problem, please contact your retailer.	Kontakt ligeledes din Bang & Olufsen forhandler, hvis fejlen ikke afhjælpes.
63	MT	[tag]Error indication, e.g. at overheating:	Fejl, f.eks. ved overophedning:
64	MT	Reduce the volume level and wait some time until the product returns to normal.	Reducer lydstyrke niveau og vent et stykke tid indtil produktet vender tilbage til normal tilstand.
65	100%	*Not applicable.	*Ikke relevant
66	MT	Placement of the indicator light.	Placering af indikatorlampe.
67	100%	8792 (5560)	8792 (5560)
68	MT	Is the surround sound processor integrated in BeoLab 14?	Er surroundsound-processor integreret i BeoLab 14 ?
69	MT	No, in BeoLab 14 the speakers and amplifiers are carefully adjusted to one another.	Nej, i BeoLab 14 højttalere og forstærkere er nøje tilpasset hinanden.
70	MT	The surround sound processor is either integrated in the TV or needs to be purchased separately.	Det surroundsound processoren er enten integreret i TV eller skal købes separat.
71	MT	For more information, see the Technical Sound Guide .	Du finder flere oplysninger i hurtigvejledningen.
72	100%	8793 (5551)	8793 (5551)
73	MT	How do I clean my BeoLab 14 and the satellites?	Hvordan rengør jeg mit BeoLab 14 og satellitterne?
74	100%	Wipe dust off the surfaces using a dry, soft cloth.	Tør støv af overfladerne med en tør, blød klud.
75	CM	If necessary, remove stains or dirt with a soft, damp cloth and a solution of water and mild detergent such as washing-up liquid.	Pletter og snavs kan fjernes med en blød klud fugtet med en opløsning af vand og et mildt rengøringsmiddel, f.eks. opvaskemiddel.
76	100%	<i>Never use alcohol or other solvents to clean any part of the product!</i>	<i>Brug aldrig sprit eller andre opløsningsmidler til rengøring af produktet</i>

Appendix 2. Source text and matches – Newsletter

Segment number	Match type	Source text segment	Match
1	MT	BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept	BeoSound 5 nu med Spotify Bang & Olufsen lancerer næste generations lydssystem
2	77%	BeoSound 5 relaunched with Spotify integration	BeoSound 5 – med Spotify Inside
3	94%	Bang & Olufsen has announced a new partnership with Spotify, the world's leading music streaming service.	Bang & Olufsen har indgået et samarbejde med Spotify, verdens førende udbyder af musikstreaming.
4	84%	Bang & Olufsen's digital music system, BeoSound 5, now ships with complete Spotify integration, adding 20 million songs in premium sound quality to	Bang & Olufsens digitale musiksystem, BeoSound 5, leveres nu med komplet Spotify-integration, og følger dermed 20 millioner sange i førsteklases lydkvalitet til det allerede alsidige repertoire for BeoSound 5.
5	MT	BeoSound 5's already versatile repertoire.	BeoSound 5's allerede alsidige repertoire.
6	76%	In line with Bang & Olufsen's dedication to continuing customer service, existing BeoSound 5 owners can easily add Spotify with a free online software update.	Integrationen er indbygget i alle nye versioner af BeoSound 5, og i overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis onlinesoftwareopdatering.
7	74%	Spotify is available in selected markets worldwide and requires Spotify Premium.	Spotify på BeoSound 5 er tilgængelig på udvalgte markeder verden over fra d. 3. april.
8	73%	Read more about BeoSound 5 and Spotify	Hvor kan jeg læse mere om BeoSound 5 og Spotify?
9	78%	Bang & Olufsen launches next-generation retail concept	Bang & Olufsen lancerer kæmpejernsynskoncept
10	MT	Bang & Olufsen has just announced an all-new design concept for its stores.	Bang & Olufsen har for nylig annonceret et helt nyt koncept for sine butikker.
11	MT	Experiencing the brand's acoustic innovations first-hand has never been more accessible or compelling.	Opleve den brand akustiske nyskabelser det har aldrig været nemmere lydfronten.
12	MT	In an atmosphere that is luxurious but welcoming, the new design captivates curiosity as you move through the store.	I en atmosfære, luksuriøst, men imødekomende, det nye design samtidig når man går gennem gemme.
13	MT	The new retail concept will be launched in Bang & Olufsen's new flagship store in Copenhagen on 18 April.	Det nye designkoncept lanceres i Bang & Olufsen's nye flagskib gemme i København den 18. april.
14	MT	Other Bang & Olufsen stores in major cities worldwide will be updated beginning later in 2013.	og i løbet af året opdateres andre Bang & Olufsen butikker i større byer verden over.
15	MT	Explore more details on the new store concept	Se flere detaljer om det nye koncept gemme
16	83%	Bang & Olufsen explores new design horizons with Pal Zileri and HOSOO	Bang & Olufsen udforsker nye designhorisonter med Pal Zileri og HOSOO på udstilling i Milano
17	97%	Bang & Olufsen showcased its iconic product design and signature sound during the Milan Furniture Fair in a unique	Bang & Olufsen præsenterer sit ikoniske produkt design og sin karakteristiske lyd på møbelmessen i Milano på en enestående

		exhibition with Italian men's fashion house Pal Zileri and Japanese textile producer HOSOO.	udstilling i samarbejde med det italienske modehus Pal Zileri og den japanske tekstilproducent HOSOO.
18	90%	On display were showpieces of the latest cuts both in Italian suits and award-winning Danish speaker design – all clad in a 1200 year-old Japanese weaving technique.	Vi vil både vise det nyeste inden for italienske jakkesæt og prisbelønnet dansk højtalerdesign – og det hele bindes sammen af en 1200 år gammel japansk væveteknik.
19	73%	The one commitment that binds all three partners?	Hvad binder dem sammen?
20	100%	An unswerving dedication to craftsmanship beyond the ordinary.	Et kompromisløst og exceptionelt engagement inden for håndværksmæssig kvalitet.
21	MT	Read more about craftsmanship beyond the ordinary	Læs mere om håndværket, der sætter
22	MT	B&O PLAY television wins coveted red dot award	B&O afspille tv vinder den eftertragtede rød prik pris
23	MT	Against more than 4000 competing products and projects from 54 countries, BeoPlay V1 took home the winning prize with the coveted red dot award for product design 2013.	I en konkurrence med over 4.000 produkter fra 54 lande BeoPlay V1 tog af med rød prik prisen for bedste produkt design i 2013.
24	MT	The all-steel industrial design is quite unique and the TV combines a lot of advanced technologies in a package that is more like a piece of furniture than consumer electronics.	Det unikke industrielle stål design og tv kombinerer en lang række avancerede teknologier i en samlet pakke, der er mere som et møbel end forbrugerelektronik.
25	MT	Enjoy more of BeoPlay V1	Se mere om BeoPlay V1

Appendix 3. Instructions for the MT-assisted TM translation part of the experimental study



AARHUS UNIVERSITET
BUSINESS AND SOCIAL SCIENCES
INSTITUT FOR ERHVERVSKOMMUNIKATION

INSTITUT FOR
ERHVERVSKOMMUNIKATION

KRISTINE BUNDGAARD

Ph.d.-studerende

Dato: 27. maj 2013

Direkte tlf.: 87165175
E-mail: kribu@asb.dk

Side 1/1

Deltagelse i ph.d.-projekt

Kære X

Mange tak, fordi du vil hjælpe mig med mit projekt og deltage i mit forsøg!

I forsøget vil jeg bede dig oversætte de to tekster, som ligger her:
[\\textminded\work-aarhus\TDJ\Oversætter_1](#)

Jeg vil bede dig starte med at oversætte FAQ-teksten og dernæst newsletter-teksten. Du bedes oversætte begge tekster, som du normalt ville oversætte sådanne tekster. I FAQ-teksten vil der være nogle ord, som er markeret med rødt, og de skal ikke oversættes (se også referenceteksten).

Mens du oversætter, vil der køre to programmer i baggrunden, som optager din oversættelsesproces. Du skal vide, at det kun er mig og måske mine vejledere, som vil se optagelserne bagefter. Jeg vil naturligvis behandle alle data fortroligt, og at du vil forblive **absolut anonym**. I øvrigt skal du vide, at jeg udelukkende er interesseret i dit arbejde i forskningsøjemed.

Jeg vil være i nærheden, mens du oversætter, og du må meget gerne sige til, når du er færdig med at oversætte teksterne. Efter ca. en times pause vil jeg meget gerne tale med dig om din oversættelsesproces. Jeg vil desuden bede dig om **ikke at tale med dine kolleger** om disse specifikke opgaver, både mens du oversætter og i ugerne derefter.

Hvis du har nogle spørgsmål, skal du endelig bare sige til!

Tusind tak for din hjælp!

Kristine

Appendix 4. Post-experimental questionnaire



AARHUS UNIVERSITET
BUSINESS AND SOCIAL SCIENCES
INSTITUT FOR ERHVERVSKOMMUNIKATION

Deltagelse i ph.d.-projekt – Spørgeskema

1. Hvad er dit navn?

2. Hvilket år er du født?

3. Køn (sæt kryds)

Mand ☐ Kvinde ☐

4. Hvad er din stillingsbetegnelse?

5. Hvad er din uddannelse?

6. Hvor længe har du været ansat hos TextMinded?

7. Hvor mange års erfaring har du med professionel oversættelse?

8. Hvad er dit modersmål?

9. Hvilke fremmedsprog oversætter du til og fra? (Skriv gerne, hvilket sprog du arbejder mest med, næstmest med osv.)



10. Har du erfaring med oversættelse af tekster fra de genrer, du arbejdede med i forsøget?

11. Har du erfaring med at oversætte for denne kunde (Bang & Olufsen)?

12. Tror du, din måde at arbejde på i dag har været påvirket af, at du vidste, at du deltog i et forsøg (sæt kryds)?

Ja ☐ Nej ☐

Forklar her, hvorfor du mener, at det har/ikke har påvirket din måde at arbejde på:

13. Hvor stor en procentdel af dit sædvanlige arbejde vil du vurdere består i oversættelse?

14. Hvor stor en procentdel af dit sædvanlige arbejde vil du vurdere består i korrekturlæsning?

15. Har du erfaring med maskinoversættelse?

Ja ☐ Nej ☐

Uddyb gerne:



16. Hvad er din holdning til maskinoversættelse, dvs. automatisk oversættelse vha. et statistisk system?

17. Hvad tror du, at brugen af maskinoversættelse kommer til at betyde for dit job som oversætter i fremtiden?

18. Hvis du har andre kommentarer, må du meget gerne skrive dem her:

Tusind tak for din hjælp!

Kristine

Kontaktoplysninger:
Kristine Bundgaard
Tlf.: 871 65 175
E-mail: kribu@asb.dk

Appendix 5. Reference text for the FAQ text



Comments for red text:

Must not be translated, eg. BeoLab 14. The words may only be marked once, but must not be translated throughout the document.

8785 (5553)

When I set up BeoLab 14, should I use PL-A (PL1) or PL-B (PL-2)?

Which **MODE** setting to use depends on the type of your Bang & Olufsen television. See below table to find out which **MODE** setting to use:

PL- A (PL1)	PL-B (PL2)
BeoVision 11 BeoPlay V1	BeoVision 10-32/40/46 BeoVision 8-26/32/40 BeoVision 7-40/55 BeoVision 9
TVs with RJ45 Power Link sockets: 	TVs with Din Power Link sockets: 

*Note that 'BeoLab 14' may not be available in the **SPEAKER TYPE** menu. See the Quick guide for more information.*

8786 (5554)

How do I adjust the sound settings on my BeoLab 14?

See the Quick guide enclosed with your BeoLab 14. For information about more advanced sound settings, see the **Technical Sound Guide**.

8787 (5555)

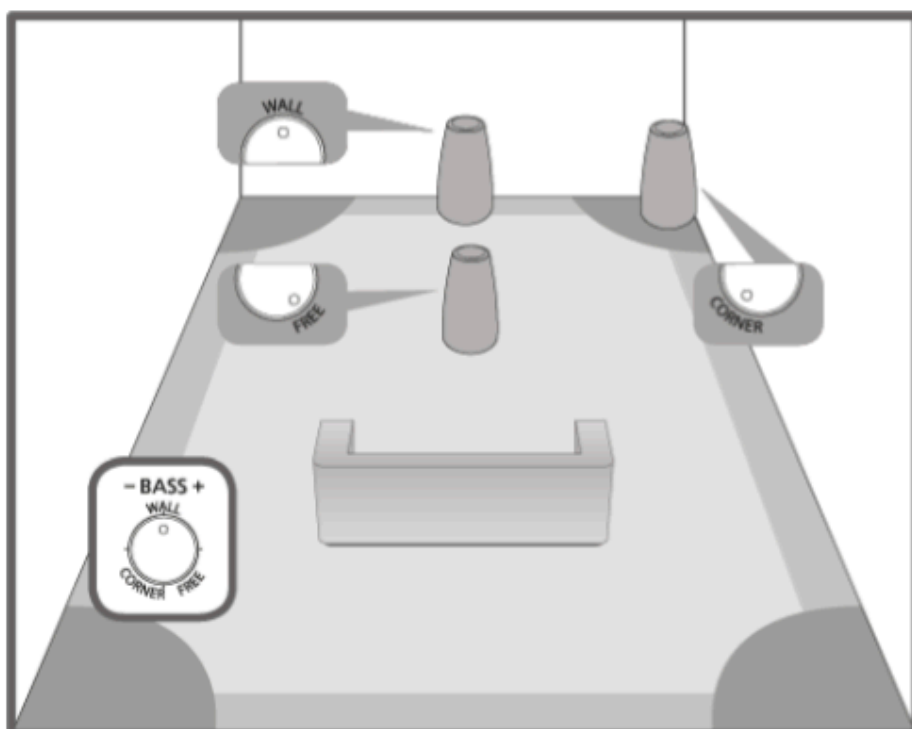
How should I set the bass position knob (FREE**, **WALL**, **CORNER**) on BeoLab 14?**

The setting of the bass position knob is based on the number of surfaces the subwoofer is in close proximity of. Use the position knob to filter out the natural bass change obtained if the subwoofer is placed, for example, in a corner, as compared to a more freestanding position.

FREE: Use this setting if the subwoofer is close to one surface (freestanding in a room or on a wall). Shown by light grey areas in the illustration.

WALL: Use this setting if the subwoofer is placed close to two surfaces (placed on the floor close to a wall). Shown by medium grey areas in the illustration.

CORNER: Use this setting if the subwoofer is placed close to three surfaces (in a corner). Shown by the dark grey areas in the illustration.



The positions mentioned are guidelines only. You may set the position knob to any position depending on your sound preference. For more details, see the [Technical Sound Guide](#).

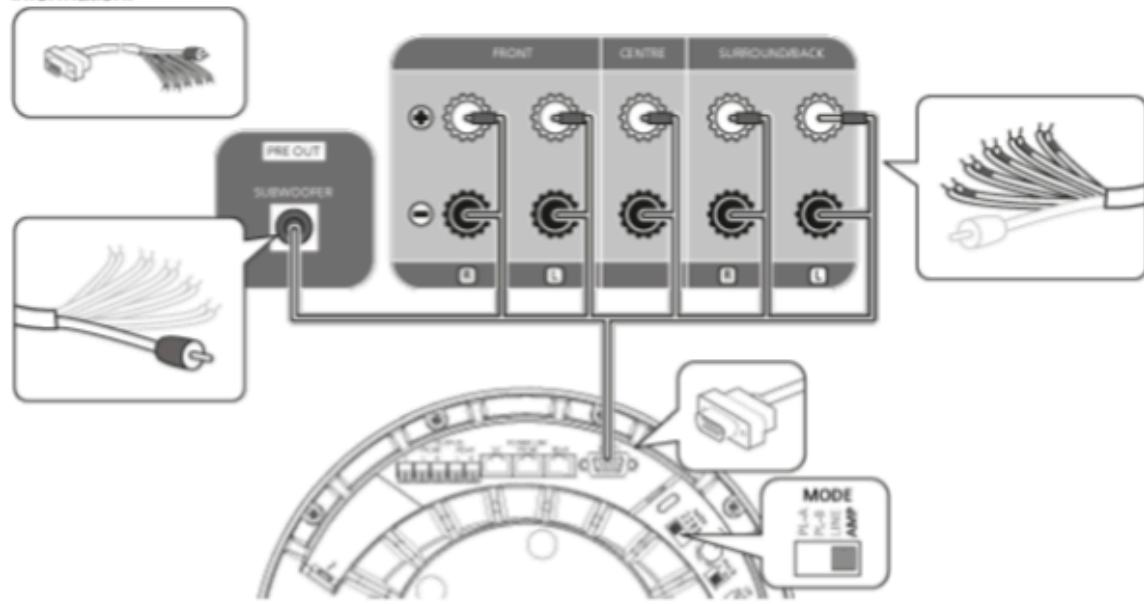
8788 (5556)

Why does my BeoLab 14 not switch to standby after 3 minutes with no sound, when the **MODE switch is set to **LINE** or **AMP**?**

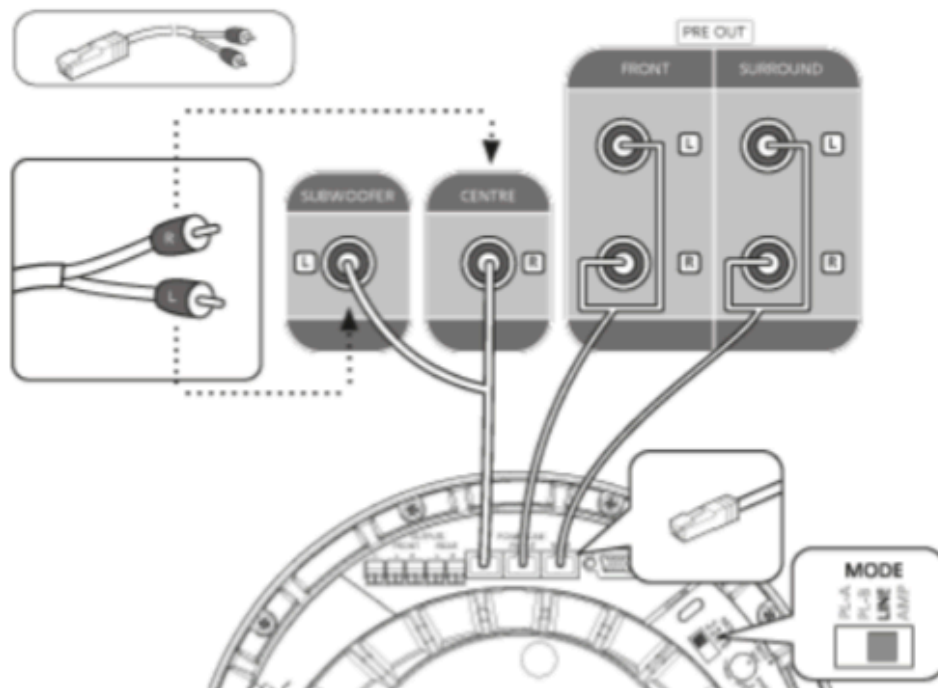
If the noise on the **LINE** or **AMP** signal is too high, the BeoLab 14 will detect this as sound and not switch off.

To avoid noise on the **LINE** or **AMP** signal make sure that you have connected all sockets on BeoLab 14 to the corresponding sockets on the connected product. See below picture or the Quick guide for more

information.



MODE switch set to AMP








MODE switch set to LINE

8790 (5558)

What does the indicator light on BeoLab 14 mean?

Indicator light	Flashing	Solid
-----------------	----------	-------

Green	 A software update in progress: <ul style="list-style-type: none"> ➤ Do not disconnect BeoLab 14 from the mains during the software update. <p><i>Note: A software update must always be performed by an authorised Bang & Olufsen retailer or service technician.</i></p>	 Switched on (10 seconds duration)
Red	n/a*	 Switched off (10 seconds duration)
Orange	 Product failure: <ul style="list-style-type: none"> ➤ Disconnect BeoLab 14 from the mains, then reconnect it to the main again. ➤ If this does not solve the problem, please contact your retailer. 	 Error indication, e.g. at overheating: <ul style="list-style-type: none"> ➤ Reduce the volume level and wait some time until the product returns to normal.

*Not applicable.



Placement of the indicator light.

8792 (5560)

Is the surround sound processor integrated in BeoLab 14?

No, in **BeoLab 14** the speakers and amplifiers are carefully adjusted to one another. The surround sound processor is either integrated in the TV or needs to be purchased separately. For more information, see the **Technical Sound Guide**.

8793 (5551)

How do I clean my BeoLab 14 and the satellites?

Wipe dust off the surfaces using a dry, soft cloth. If necessary, remove stains or dirt with a soft, damp cloth and a solution of water and mild detergent such as washing-up liquid.

Never use alcohol or other solvents to clean any part of the product!

Appendix 6. Process examples with parts of retrospective interviews

EXAMPLE 1-FAQ-B-14:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator B	14	MT	Accept	N/A	N/A
Source text segment		TVs with Din Power Link sockets:			

Step 1 – Provided match:

Fjernsyn med **DIN Power Link** stik:

Step 2:

Selects "Power Link" in the source segment and runs a concordance search.

Fjernsyn med **DIN Power Link** stik:

App. X, B, ll. 138-140:

B: hvad var det jeg fik foreslået i t a a?

KB: jamen du har fået det der foreslået

B: Fjernsyn med ... jamen så må jeg jo have tænkt at det kunne bruges

Step 3:

Returns to this segment again after having made a change in segment 9. Confirms the segment.

Fjernsyn med **DIN Power Link** stik:

EXAMPLE 2-FAQ-D-68:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator D	68	MT	Accept	N/A	N/A
Source text segment		Is the surround sound processor integrated in [tag] BeoLab 14 [tag]?			

Step 1 – Provided match:

Er surroundsound-processor integreret i[tag] **BeoLab 14**[tag] ?

EXAMPLE 3-NL-E-1:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator E	1	MT	Accept	N/A	N/A
Source text segment		BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept			

Step 1 – Provided match:

BeoSound 5 nu med Spotify | Bang & Olufsen lancerer næste generations lydssystem

App. X, E, ll. 377-385:

E: øhm (pause) jeg tror lige jeg sku' nå og tænke at vi var **lige** ovre i en anden tekstgenre og ... det lige pludselig ... blev knap så ... hva' ska' man sige manualagtigt

KB: ja
 E: øhm (pause) ja og så ku' jeg da huske jeg tænke at det der stod i målsegmentet var da lidt langt væk fra det der stod i hh hvad hedder det ... kildeselementet
 KB: mm-mm
 E: så jeg sku' lige finde ud af om den var god nok ... at vi godt ku' skrive det
 KB: ja
 E: øhm ... ja ... og blev enig med mig selv om lige i foreløbig at det ku' man vist godt

Step 2:

Selects "retail concept" in the source segment and runs a concordance search.

BeoSound 5 nu med Spotify | Bang & Olufsen lancerer næste generations lydssystem

EXAMPLE 4-NL-G-10:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator G	10	MT	Accept	N/A	N/A
Source text segment		Bang & Olufsen has just announced an all-new design concept for its stores.			

Step 1 – Provided match:

Bang°& Olufsen har for nylig annonceret et helt nyt koncept for sine butikker.

App. X, G, ll. 489-496:

KB: ja ... okay og så går du tilbage til segment ti ja

G: ja

KB: [okay]

G: [og der tror jeg] jeg øh ... starter med og ... acceptere (pause) øhm ... men senere mener jeg jeg går tilbage og og og ff og sætter "design" ind øhm ... [foran "koncept"]

KB: [foran] ja ... okay

G: finder så lige ud af at jeg mangler den der non-breaking

KB: nårh ja

Step 2:

Enters this segment and then returns to segments 1 and 2.

Bang°& Olufsen har for nylig annonceret et helt nyt koncept for sine butikker.

Step 3:

Selects "design concept" in the source segment and runs a concordance search.

Bang°& Olufsen har for nylig annonceret et helt nyt koncept for sine butikker.

EXAMPLE 5-FAQ-D-3:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator D	3	MT	Reject	N/A	N/A
Source text segment		Which [tag]MODE[tag] setting to use depends on the type of your Bang & Olufsen television.			

Step 1 – Provided match:

Hvilken TILSTAND[tag][tag] indstilling afhænger af dit Bang & Olufsen fjernsyn.

Step 2:

Uses Copy Source to Target.

Which [tag]MODE[tag] setting to use depends on the type of your Bang & Olufsen television.

App. X, D, ll. 235-246:

D: [hvilken tilstand indstilling] afhænger af dit ja

KB: ja

D: nej der vil jeg sige der synes jeg ... hva' ska' man sige sådan som det står og så oven i at øh at vi også har øh ... noget der ska' bevares og de her koder

KB: mm

D: så tænkte jeg ja så er det så er det altså ... hvis sætningen alligevel ska' omformuleres ... i sin (pause) grundsubstans

KB: mm

D: øhm ... så så burde jeg kopiere øh ... mode og koderne over

KB: ja ... okay

D: frem for at begynde og flytte rundt på elementerne derovre som som alligevel ikke står i den rækkefølge jeg ska' bruge dem i

Step 3:

Selects "Which" and deletes it. Writes "-indstillingen" after "MODE" and the tag. While writing "-indstillingen", the translator is offered "indstilling" by the AutoSuggest function. It is not used by the translator.

[tag]MODE[tag]-indstillingen setting to use depends on the type of your Bang & Olufsen television.

App. X, D, 249-263:

KB: og ka' du huske noget om der når du så efter du har kopieret source over nu og så oversætter du så resten af sætningen ... er det ka' du huske noget om hva' du tænkte der? ... Om er det noget du ka' huske på det tidspunkt at du har set før eller ... er det bare ... er det bare ud fra ... source eller?

D: det er ud fra source

KB: Det er ud fra source ja

D: ja

KB: okay

D: jeg overvejede lidt om det sku' være ... øh om det sku' være tv eller om det sku' være fjernsyn

KB: ja

D: men øh ... så tænkte jeg jeg bliver nok klogere

KB: ja ja [du støder på () andet]

D: latter

D: [så tog jeg en hurtig beslutning] tog en hurtig beslutning øh ... ja

Step 4:

Writes "afhænger af dit". Deletes "setting to use depends on the type of your". Writes "-fjernsyn" after "Olufsen". Deletes "television".

[tag]MODE[tag]-indstillingen afhænger af dit Bang & Olufsen-fjernsyn.

EXAMPLE 6-FAQ-E-39:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator E	39	MT	Reject	N/A	N/A
Source text segment		Why does my [tag]BeoLab 14[tag] not switch to standby after 3 minutes with no sound, when the [tag]MODE[tag] switch is set to [tag]LINE[tag] or [tag]AMP[tag]?			

Step 1 – Provided match:

Hvorfor bliver min [tag] BeoLab 14[tag] ikke omskifter til standby efter 3 minutter uden lyd, når tilstanden[tag][tag] omskifter er indstillet til[tag] Line[tag] eller AMP[tag][tag] ?

Step 2:

Uses Copy Source to Target.

Why does my [tag]BeoLab 14[tag] not switch to standby after 3 minutes with no sound, when the [tag]MODE[tag] switch is set to [tag]LINE[tag] or [tag]AMP[tag]?

App. X, E, ll. 180-189:

E: øhm jeg tror jeg tænkte jeg ku' godt bruge nogen af termene men det var lidt noget rod ... øh ... så jeg ka' ikk' huske om jeg ss kopierer source over med det samme ... øhm ... og så er jeg oppe [og kigge her foroven]

KB: [Det gør du der]

E: for at se ... hva' for nogen termer jeg lige ska' ... tyvstjæle

KB: okay så når du efter du har kopieret source ind og når du oversætter kigger du så derop på det AT segment tror du?

E: ja det mener jeg jeg gjorde

KB: Ja

E: fordi jeg synes der var nogle af termene jeg godt ku' bruge til noget

Step 3:

Writes "Hvorfor" in the beginning of the segment. Deletes "Why does my". Writes "skifter min". Writes "ikke til" after "14". Deletes "not switch to". Deletes "a" in "after", writes "e".

Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutes with no sound, when the [tag]MODE[tag] switch is set to [tag]LINE[tag] or [tag]AMP[tag]?

Step 4:

Places the cursor between "minut" and "es" in "minutes" and writes "ter uden lyd". While writing "lyd", the translator is offered "lydtype" by the AutoSuggest function, but does not use it. Deletes "es with no sound".

Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, when the [tag]MODE[tag] switch is set to [tag]LINE[tag] or [tag]AMP[tag]?

Step 5:

Writes "når" before "when". Deletes "when the". Selects "MODE switch" in the target segment and runs a concordance search. It finds occurrences of "switch mode" in Danish text in the TM. Selects "switch" in the target segment and runs a concordance search. It finds occurrences of "switch" in Danish text in the TM.

Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, når [tag]MODE[tag] switch is set to [tag]LINE[tag] or [tag]AMP[tag]?

App. X, E, ll. 193-195:

E: øhm ... og så tror jeg jeg ... søgte lidt på den der "mode switch" for lige at finde ud af hvad sådan en "switch" den sku' kaldes det ka' godt være jeg havde haft den før men så havde jeg glemt hvad jeg kaldte den

Step 6:

Selects "switch" in the source segment and runs a concordance search. Selects "MODE switch" in the source segment and runs a concordance search. No relevant results. Writes "-omskifteren er sat til". When writing "omskifteren", the translator is offered "omskifter" by the AutoSuggest function, but does not use it.

Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, når [tag]MODE[tag]-omskifteren er sat til switch is set to [tag]LINE[tag] or [tag]AMP[tag]?

Step 7:

Deletes "switch is set to". Deletes "o" in "or", writes "elle".

Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, når [tag]MODE[tag]-omskifteren er sat til [tag]LINE[tag] eller [tag]AMP[tag]?

Step 8:

Returns to this segment after having entered segment 46. Selects "sat" and deletes it by writing "indstillet".

Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, når [tag]MODE[tag]-omskifteren er indstillet til [tag]LINE[tag] eller [tag]AMP[tag]?

EXAMPLE 7-NL-G-9:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator G	9	78%	Reject	N/A	N/A
Source text segment		Bang & Olufsen launches next-generation retail concept			

Step 1 – Provided match:

Bang & Olufsen lancerer kæmpefjernsynskoncept

Step 2:

Inserts the MT match visible in the Translation Results window.

Bang & Olufsen lancerer næste generations lydsystem

App. X, G, ll. 451-461:

G: ja og der er det det der ff "forhandlerkoncept" og og "splinternyt" og "next generation"

KB: ja

G: øhm ... hvor jeg ka' da i hvert fald se at det ord der står det ka' jeg jo ikk' bruge til noget

KB: nej

G: øh det er "forhandlerkonceptet" øhm ...

KB: [og der henter du faktisk ja]

G: [og der der vælger jeg ss] ja det tog jeg for jeg ku' se jeg ku' bruge mere af det ... bud to der var heroppe end end et'eren

KB: ja

G: jeg tænkte så så tar vi det ... det var den der stod oppe i i starten ...

Step 3:

Selects "lydsystem" and deletes it by writing "forhandlerkoncept". Selects "næste generations" and deletes it by writing "et sprinter". Deletes "rinter", writes "linternyt". Selects "splinternyt" and copies it.

Bang & Olufsen lancerer et splinternyt forhandlerkoncept

App. X, G, ll. 467-482:

G: og så får jeg jo skiftet ud med "forhandlerkoncept" og så er det jeg ... igen tænker det der næste generations det ikk' ... det lyder ikk' særligt godt

KB: [nn-nn]

G: [øh] ... i den forbindelse

KB: nej ... okay

G: og der har jeg måske også siddet og tænkt lidt og så ... tænkt arh men det øh ... vi vi må finde på noget andet

KB: ja

G: det bli'r så splinternyt til at starte med

KB: ja

KB: latter

G: og så ka' jeg jo se det ord det ka' jeg ... jeg ka' huske den var oppe i starten

KB: ja

G: så går jeg lige op og ...

KB: [og retter det til]

G: [og skifter ud deroppe]

Step 4:

Returns to this segment after having worked with other segments. Selects the space between "Bang" and "&" and replaces it with a non-breaking space.

Bang& Olufsen lancerer et splinternyt forhandlerkoncept

EXAMPLE 8-NL-E-22:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator E	22	MT	Reject	N/A	N/A
Source text segment		B&O PLAY television wins coveted red dot award			

Step 1 – Provided match:

B&O afspille tv vinder den eftertragtede rød prik pris

Step 2:

Selects "B&O PLAY television" in the source segment and runs a concordance search. Uses Copy Source to Target.

B&O PLAY television wins coveted red dot award

Step 3:

Writes "vinder den eftertragtede " between "PLAY" and "television". Deletes "television wins coveted ". Selects "red dot award" and copies it. Goes to Google and runs a search for "red dot award". Google is still set to "sites in Danish". The translator adjusts the settings to search the Web in general. Clicks on the web page with the title: "red dot online: home". Returns to the translation file and confirms segment 22.

B&O PLAY vinder den eftertragtede red dot award

Step 4:

Returns to this segment while working with segment 23 to copy "den eftertragtede red dot award".

B&O PLAY vinder den eftertragtede red dot award

EXAMPLE 9-FAQ-G-39:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator G	39	MT	Revise	Match-internal	N/A
Source text segment		Why does my BeoLab 14 not switch to standby after 3 minutes with no sound, when the MODE switch is set to LINE or AMP ?			

Step 1 – Provided match:

Hvorfor bliver min **BeoLab 14** ikke omskifter til standby efter 3 minutter uden lyd, når tilstanden omskifter er indstillet til **Line** eller **AMP** ?

Step 2:

Writes "skifter" between "Hvorfor" and "bliver". Deletes "bliver min". Selects the space between "BeoLab" and "14" and inserts a non-breaking space. Deletes "omskifter".

Hvorfor skifter **BeoLab 14** ikke til standby efter 3 minutter uden lyd, når tilstanden omskifter er indstillet til **Line** eller **AMP** ?

App. X, G, ll. 150-175:

G: ja ... øhm (pause) der tænker jeg ... øhm ... det er jo igen altså øh maskin ... måden og skrive på den tar jo ligesom sætningerne som de skrider frem

KB: ja

G: øh og jeg ka' se at ... øh igen tænker jeg lige hva' er den hva' er den ... nn logiske eller den bedste danske formulering ... jamen det må jo være som jeg skriver der "hvorfor skifter ... BeoLab ikke om

KB: ja

G: til standby" øh ... og så fjerner jeg "min" øh ... fordi det bruger vi som regel ikk' i B&O øh [oversættelser]

KB: [okay]

G: som jeg jo så har prøvet nogle gange

KB: okay

G: øh

KB: ja for det ku' jeg også se du havde gjort nogle forskellige steder der tænkte jeg nemlig også øh ... om det sådan var en

G: [ja]

KB: [konvention] på en eller anden måde

G: det er det

KB: ja

G: øh ... lige præcis for øh ... for B&O altså ... der er ikke noget galt i og skrive "min" men men ... tit prøver de og holde øh ... den lidt mere upersonlig

KB: [okay]

G: [øh]

KB: ja

G: sådan at den ... ja altså det er ikke bliver en en ... en dialog men men mere et generelt spørgsmål der bliver stillet

Step 3:

Selects the space between "3" and "minutter" and inserts a non-breaking space. Writes "MODE-om" after "når" and deletes "tilstanden om". Writes "en" at the end of "omskifter".

Hvorfor skifter BeoLab¹⁴ ikke til standby efter 3^o minutter uden lyd, når MODE-omskifteren er indstillet til Line eller AMP?

App. X, G, ll. 177-186:

G: og her så ka' du se der ... har jeg også lært at det gør ikk' så meget om den ... er rød eller ej

KB: nej

G: hovedformålet er at den ikk' bliver oversat

KB: [ja]

G: [det] kommer ikk' til at stå med rød i i øh ... den endelige

KB: nej og det nej det ka' man bare fjerne øh som en sidste

G: ja

KB: ja

G: det vigtige er bare den ikk' blir' oversat

Step 4:

Selects "Line" and changes it to capital letters. Deletes a space between "AMP" and "?".

Hvorfor skifter BeoLab¹⁴ ikke til standby efter 3^o minutter uden lyd, når MODE-omskifteren er indstillet til LINE eller AMP?

EXAMPLE 10-FAQ-B-70:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator B	70	MT	Revise	Match-internal	N/A
Source text segment		The surround sound processor is either integrated in the TV or needs to be purchased separately.			

Step 1 – Provided match:

Det surroundsound processoren er enten integreret i TV eller skal købes separat.

Step 2:

Writes "S" in the beginning of the segment. Deletes "Det s". Inserts a space between "Surround" and "sound".

Inserts a hyphen between "sound" and "processoren".

Surround sound-processoren er enten integreret i TV eller skal købes separat.

Step 3:

Writes "tv'et" between "i" and "TV". Deletes "TV".

Surround sound-processoren er enten integreret i tv'et eller skal købes separat.

Step 4:

Writes "s" at the end of "købes", deletes "s". Writes "særskilt". While writing "særskilt", the translator is offered "surroundsound" by the AutoSuggest function, but does not accept it. Deletes "separat".

Surround sound-processoren er enten integreret i tv'et eller skal købes særskilt.

App. X, B, ll. 332-345:

KB: ja det var måske den sidste del jeg tænkte på tror jeg hva' om du kan huske hvad du tænkte lige der da du så i stedet for "skal købes separat" "skal købes særskilt"?

B: det er bare min øhm ... det er en af mine kæpheste

KB: Okay

B: fordi øh separat det er også sådan engelsk inspiration øh ... og det det øhm ... ja

KB: ja

B: det er simpelthen ... der kører jeg ige sådan en kæphest henover

KB: ja okay

B: der har vi et godt dansk ord som ikke bliver brugt særligt meget

Begge: latter

KB: ja

B: jamen alting der er jo det er jo igen ikke altså der står separatly og så øh

KB: ja

B: så skriver folk separat

EXAMPLE 11-NL-D-6:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator D	6	76%	Revise	Match-internal	N/A
Source text segment		In line with Bang & Olufsen's dedication to continuing customer service, existing BeoSound 5 owners can easily add Spotify with a free online software update.			

Step 1 – Provided match:

Integrationen er indbygget i alle nye versioner af BeoSound 5, og i overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis onlinesoftwareopdatering.

Step 2:

Selects "Integrationen er indbygget i alle nye versioner af BeoSound 5, og i" and deletes it by writing "I".

I overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis onlinesoftwareopdatering.

App. X, D, ll. 686-688:

D: ... nah men der var jeg oppe og kigge her ... oppe og ... fandt ret hurtig ud af at ... eller i konkordansen og fandt ret hurtigt ud af at øh ... det var første del af sætningen der ligesom sku' skæres væk øhm ...

Step 3:

Inserts a hyphen between "5" and "ejere". Selects "eksisterende" and deletes it by writing "nuværende ejere af". Deletes "-ejere".

I overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan nuværende ejere af BeoSound 5 nemt tilføje Spotify via en gratis onlinesoftwareopdatering.

App. X, D, ll. 710-720:

D: [og så] ... ja og så vendte jeg den her ... øhm ... hva' stod der beosound fem ... ej eksisterende beosound 5 ejere eller noget i den dur har der sikkert stået

KB: mm

D: som som output fra fra engine ikk'

KB: ja

D: hvor jeg synes nuværende ejere af beosound fem måske ... er lidt mere ... er en lidt mere dansk løsning

KB: ja ... okay

D: øhm

KB: ja

D: også for at undgå den her bindestreg beosound fem ejere

Step 4:

Places the cursor between "f" and "okus" in "fokus" and writes "ortsatte f". Selects "fortsat" and deletes it.

I overensstemmelse med Bang & Olufsens fortsatte fokus på kundeservice kan nuværende ejere af BeoSound 5 nemt tilføje Spotify via en gratis onlinesoftwareopdatering.

App. X, D, ll. 690-706:

D: så synes jeg dedication to continuing customer service ... øhm ... var en smule mærkelig

KB: ja

D: så jeg endte faktisk med og rette det til fortsat fokus på kundeservice

KB: mm-mm ja

D: øhm ... som jeg synes gav mere mening men det var også en jeg helt klart ville have vendt med kunden hvis det var

KB: okay

D: for at høre om det var det ... altså om de mente ... deres fortsatte fokus eller de faktisk mente fortsat kundeservice

KB: ja

D: [som] egentlig ikke giver altså hvad hvad hvad ligger der så i continuing customer service

KB: ja

D: er det så en uendelig kundeservice eller

KB: ja

D: hvor de vil hen med det ... men sådan umiddelbart vil jeg tro at det var et fortsat fokus

EXAMPLE 12-NL-C-10:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator C	10	MT	Revise	Match-internal	N/A
Source text segment		Bang & Olufsen has just announced an all-new design concept for its stores.			

Step 1 – Provided match:

Bang & Olufsen har for nylig annonceret et helt nyt koncept for sine butikker.

App. X, C, ll. 632-640:

C: øh der var jeg lidt i tvivl om hvad jeg sku' kalde hvordan jeg skulle oversætte "stores" om det sku' være butikker eller forretninger

KB: ja

C: øh ... jeg sys ikk' rigtigt der var noget hjælp oppe i ... op i TM'en så ... jeg valgte butikker

KB: ja

C: ja

KB: ja okay

C: jeg tænkte det øh ... det lød okay synes jeg

Step 2:

Writes "design" before "koncept". While writing "design", the translator is offered "designer" by the AutoSuggest function, but does not use it. Selects "for nylig" and deletes it by writing "netop".

Bang & Olufsen har netop annonceret et helt nyt designkoncept for sine butikker.

App. X, C, ll. 641-651:

KB: og så retter du for nylig [til netop]

C: [det er rigtigt] for nylig ja fordi jeg kom til og se at øh der stod jo faktisk just så tænkte jeg at så var ... netop

KB: [ja]

C: [måske] bedre ikk'

KB: ja ... så det var mere tæt tæt på nu end [for nylig]

C: [ja det synes jeg] ja præcis ja

KB: ja

C: det er det

KB: ja

C: for at gøre det måske osse lidt mere aktuelt og ... ja

Step 3:

Returns to this segment while working with segment 11 to copy "Bang & Olufsen".

Bang & Olufsen har netop annonceret et helt nyt designkoncept for sine butikker.

EXAMPLE 13-FAQ-B-2:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator B	2	MT	Revise	Match-external	Concordance search
Source text segment		When I set up BeoLab 14 , should I use PL-A (PL1) or PL-B (PL-2)?			

Step 1 – Provided match:

Når jeg BeoLab 14 , skal jeg anvende PL-A (PL1) eller PL-B (PL-2)?

Step 2:

Selects "set up" in the source segment and runs a concordance search.

Når jeg BeoLab 14 , skal jeg anvende PL-A (PL1) eller PL-B (PL-2)?

App. X, B, ll. 35-43

B: ... mm (pause) jeg tror det er fordi jeg har tænkt på at der manglede et eller andet jeg tror faktisk verbet manglede i den KB: Ja

B: i i den der kom fra øhm ... fra MT

KB: okay

B: så det har jeg lige siddet og ... og kigget på

KB: ja

B: ja og så skulle jeg så lige så ville jeg lige tjekke i basen ... i eller i TM'en hva' ... hvad det var de plejede at bruge for set up

Step 3:

Writes "konfigurer" between "jeg" and "BeoLab", deletes "uer", writes "urer". Writes "så" between "jeg" and "anvende".

Når jeg konfigurer BeoLab 14 , skal jeg så anvende PL-A (PL1) eller PL-B (PL-2)?

Step 4:

Returns to this segment after having entered segment 51. Inserts a non-breaking space after "BeoLab" and deletes the space before "14".

Når jeg konfigurer BeoLab 14 , skal jeg så anvende PL-A (PL1) eller PL-B (PL-2)?

EXAMPLE 14-NL-D-1:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator D	1	MT	Revise	Match-external	Concordance search x 2
Source text segment		BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept			

Step 1 – Provided match:

BeoSound 5 nu med Spotify | Bang & Olufsen lancerer næste generations lydsystem

App. X, D, ll. 617-659:

D: [ja det sys jeg ikk' var så nemt] ...

KB: nej

D: fordi det skal jo være det er en overskrift så det ska' jo være sådan øh ... det ska' jo være sådan lidt punchy og ikk' for langt og det er meget langt

KB: mm

D: ka' man sige på engelsk og det er vanskeligt og få det til og ... øhm ... altså at koge det ned hvis man ska' ha' næste generation med

KB: ja

D: øh ... og så tænkte jeg jamen siger man næste generation af et lydsystem eller hvad hedder det detail øh koncept eller ... øh næste detail detailkonceptgeneration altså det bliver ... det bliver bare ... for meget

KB: mm-mm

D: øhm ... og så endte jeg egentlig også til sidst med og ændre overskriften til nyt

KB: ja

D: øhm ... butikskoncept ... nyt butikskoncept [altså]

K:B [mm]

D: og så glemme den der generation ... næste generation

KB: ja

D: øhm ... man ka' sige det her med next generation på altså det er jo meget brugt på engelsk og vi altså og afsmitningen til dansk gør jo også at vi ... at vi vi taler om næste generation og anden generations og øh tredje

generations og
 KB: mm-mm
 D: og så videre med øhm ... men jeg vurderede alligevel at det ... det væsentlige ligesom var at få signaleret at det er et **nyt**
 KB: ja
 D: butikskoncept ... øh da jeg vendte tilbage til den i hvert fald [øhm]
 KB: [ja]
 D: men jeg havde sådan lidt nogle overvejelser i forhold til længden osse ... ja i forhold til og ... og gøre det ... sådan elegant
 KB: ja
 D: ja elegant og kort det var egentlig det jeg ... det var egentlig det jeg tænkte
 KB: ja ja
 D: og generelt tænker om overskrifter altså det øhm ... det det synes jeg ofte er den udfordring der ligger i og oversæt ... overskrifter
 KB: mm-mm
 D: og nogen gange må man fjerne sig lidt fra udgangsteksten for at få noget der ligesom ... ja står klart nok
 KB: mm-mm
 D: ja
 KB: ja
 D: så jeg skrottede den der
 KB: den der næste generation
 D: den nye generation ja

Step 2:

Selects "next generation retail concept" in the source segment and runs a concordance search. Selects "next generation" in the source segment and runs a concordance search.

BeoSound 5 nu med Spotify | Bang & Olufsen lancerer næste generations lydsystem

Step 3:

Selects "næste generations lydsystem" and deletes it by writing "den nye generation af detailkoncepter". Deletes "den". Deletes "e" in "nye". Deletes "er" in "detailkoncepter".

BeoSound 5 nu med Spotify | Bang & Olufsen lancerer ny generation af detailkoncept

EXAMPLE 15-FAQ-E-40:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator E	40	MT	Revise	Match-external	Copy Source to Target + Concordance search
Source text segment		If the noise on the [tag]LINE[tag] or [tag]AMP[tag] signal is too high, the [tag]BeoLab 14[tag] will detect this as sound and not switch off.			

Step 1 – Provided match:

Hvis støj på [tag] Line[tag] eller AMP[tag][tag] signal er for høj, [tag]BeoLab 14[tag] bliver det registreret som lyd og ikke omskifter fra.

Step 2:

Writes "en" at the end of "støj". Uses Copy Source to Target.

If the noise on the [tag]LINE[tag] or [tag]AMP[tag] signal is too high, the [tag]BeoLab 14[tag] will detect this as sound and not switch off.

App. X, E, II. 205-209

E: øhm jamen der tænkte jeg at det der line [det røde line]

KB: [mm]

E: i de der tags ... det ku' jeg egentligt ikke rigtigt bruge til noget helt fra start af ... så der fik jeg vist ko kopieret source over nærmest med det samme

KB: ja det gør du der ja

Step 3:

Writes "Hvis støjen på" in the beginning of the segment. While writing "støjen", the translator is offered "støj" by the AutoSuggest function, but does not use it. Deletes "If the noise on the".

Hvis støjen på [tag]LINE[tag] or [tag]AMP[tag] signal is too high, the [tag]BeoLab 14[tag] will detect this as sound and not switch off.

App. X, E, ll. 210-219

E: øh ... og så ... kiggede jeg igen op foroven i det der ... er det fra ... det er fra maskinoversættelse eller hva'?

KB: ja

E: [Okay]

KB: [AT ()]

E: der kiggede jeg op der igen

KB: ja

E: for at ta' det jeg ku' jeg bruge

KB: okay

E: og det var jo egentlig ret meget af det ka' jeg se ... faktisk

Step 4:

Writes "eller" before "or", deletes "or". Inserts a hyphen after "LINE" and the tag. Inserts a hyphen after "AMP" and the tag. Deletes the space between "AMP-" and "signal". Writes "et" at the end of "AMP-signal".

Hvis støjen på [tag]LINE[tag]- eller [tag]AMP[tag]-signalet is too high, the [tag]BeoLab 14[tag] will detect this as sound and not switch off.

Step 5:

Writes "er for høj" after "AMP-signalet". Deletes "is too high". Writes "registrerer" before "the", then deletes "the". Writes "det som lyd og" after "14". Selects "will detect this as sound and not" and deletes it.

Hvis støjen på [tag]LINE[tag]- eller [tag]AMP[tag]-signalet er for høj, registrerer [tag]BeoLab 14[tag] det som lyd og switch off.

App. X, E, ll. 220-224

KB: og så ændrer du vist lidt i konstruktionen måske lige der bagefter

E: øhm

KB: ja "registrerer beolab 14 det"

E: ja

KB: ja

Step 6:

Selects "switch off" in the source segment and runs a concordance search. Opens a folder on the computer, but does not do anything with it. Returns to the translation. Places the cursor between "s" and "witch" in "switch" and writes "lukker". Selects "witch off" and deletes it.

Hvis støjen på [tag]LINE[tag]- eller [tag]AMP[tag]-signalet er for høj, registrerer [tag]BeoLab 14[tag] det som lyd og slukker.

App. X, E, ll. 225-230

E: og der skriver jeg noget med "slukker ikke" i stedet for [det der]

KB: [mm]

E: ikke omskifter fra

KB: ja ... okay ... øhm ... nu ska' jeg prøve og se ... ja der undersøger du også det der "switch off" [ja]

E: [mm]

EXAMPLE 16-FAQ-G-19:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator G	19	71%	Revise	Match-external	Copy/cut → Copy Source to Target → Insert
Source text segment		How do I adjust the sound settings on my BeoLab 14?			

Step 1 – Provided match:

Hvordan ændrer jeg indstillingerne på Beolit°14?

Step 2:

Selects "Hvordan ændrer jeg indstillingerne på" and copies it. Uses Copy Source to Target.

How do I adjust the sound settings on my BeoLab 14?

App. X, G, ll. 78-114:

G: [altså der kan jeg] jo så igen se at ... at der mangler noget

KB: ja

G: øh det gør at jeg kopierer lige lyden ud øh sludder sætningen ud øh den danske del for den ka' jeg genbruge der er ingen grund til at jeg sidder og skriver det igen ... øhm ... og så kommer jeg i tanke om her at

KB: latter

G: jeg mangler den der non-breaking space som øh B&O er meget glade for

KB: okay [oppe i segment to]

G: [øh]

KB: [ja]

G: [ja] så ... og den ku' jeg se jeg skal ha' ind her hvor der egentlig stod BeoLit før nu står der så BeoLab

KB: ja

G: øhm ... og igen så mangler ordet ... øh "sound" øh som som oversættelse så den får jeg lige ... sat ind

KB: ja ... så du starter med og kopiere ... det danske eller hvad ... og så kopiere

G: det er det danske jeg ss jeg ka' bruge

KB: [ja]

G: [ja] og så kopierer jeg sourcedeksten over fordi ... jamen der står BeoLab øh ... i rød jeg tror jeg ja ikk' huske om det stod i i sort så det er egentlig for ligesom og bevare

KB: ja

G: øh ... formateringen [i]

KB: [okay]

G: øh source eller øh i hvad hedder det targetsegmentet øh ... jeg ved godt her gør det ikk' noget men det er simpelthen en gammel vane [vi har været]

KB: [ja]

G: vant til at man ska' pas på når noget står i fed eller kursiv eller rød eller så videre

KB: ja

G: så for ikke og pille ved noget der ku' gi' problemer senere i genereringen af filen så prøver jeg egentlig og holde øh opsætningen så meget som muligt ... men jeg ku' se at jeg ku' bruge en stor del af teksten så den kopierer jeg lige ud først

KB: ja

G: trykker på alt insert øh ... shift insert eller hvad det nu er

KB: ja

G: øh ... og så kopierer jeg den tekst ind jeg ka' bruge

KB: okay

G: igen bare for og spare mig selv for ... for alt for mange øh unødvendige taste

Step 3:

Selects "How do I adjust the sound settings on my" and inserts "Hvordan ændrer jeg indstillingerne på". Selects the space between "BeoLab" and "14" and replaces it with a non-breaking space.

Hvordan ændrer jeg indstillingerne på BeoLab°14?

Step 4:

Returns to this segment after having made a change in segment 2. Writes "lyd" before "indstillingerne".

Hvordan ændrer jeg lydindstillingerne på BeoLab°14?

EXAMPLE 17-NL-G-22:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator G	22	MT	Revise	Match-external	Copy/Cut → Copy Source to Target → Insert
Source text segment		B&O PLAY television wins coveted red dot award			

Step 1 – Provided match:

B&O afspille tv vinder den eftertragtede rød prik pris

Step 2:

Selects "vinder den eftertragtede ", copies it and uses Copy Source to Target.

B&O PLAY television wins coveted red dot award

Step 3:

Selects the space between "B&O" and "PLAY" and replaces it with a non-breaking space. Writes "fjernsyn" before "television" and inserts "vinder den eftertragtede".

B&O°PLAY fjernsyn vinder den eftertragtede television wins coveted red dot award

Step 4:

Deletes "television wins coveted". Writes "pris" before "red". Selects the space between "red" and "dot" and replaces it with a non-breaking space. Selects the space between "dot" and "award" and replaces it with a non-breaking space.

B&O°PLAY fjernsyn vinder den eftertragtede pris red°dot°award

EXAMPLE 18-FAQ-B-16:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator B	16	91%	Revise	Match-external	Reference text + Concordance search + Termbase search
Source text segment		<i>See the Quick guide for more information.</i>			

Step 1 – Provided match:

Se yderligere oplysninger i onlinevejledningen.

Step 2:

Consults the reference text. Selects "Quick guide" in the source segment and runs a concordance search.

Searches in the termbase for "quick guide".

Se yderligere oplysninger i onlinevejledningen.

Step 3:

Writes "den korte vejledning" between "i" and "onlinevejledningen". Deletes "onlinevejledningen".

Se yderligere oplysninger i den korte vejledning.

EXAMPLE 19-NL-H-11:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator H	11	MT	Revise	Match-external	Termbase search + Concordance search x 3
Source text segment		Experiencing the brand's acoustic innovations first-hand has never been more accessible or compelling.			

Step 1 – Provided match:

Opleve den brand akustiske nyskabelser det har aldrig været nemmere lydfronten.

App. X, H, ll. 511-540:

KB: ja okay ... øhm ... så sagde du også på et tidspunkt øh ... nu ska' jeg lige prøve og se ... der er vi faktisk herhenne (pause) øh (pause) et eller andet med at det var en god sætning for kritikere

H: ja

KB: det må være den dernede tror jeg ... som du skifter til lige om lidt

H: ja ja ... det var helt skidt

KB: ja der sagde du også sådan noget arg du ved ... øh

H: det er virkelig en en en øh et gg ... øhm ... et godt bevis på hvordan

KB: ja

H: hvordan det fungerer når det fungerer ringest ... maskinoversættelse

KB: ja

H: netop at den simpelthen tar ... enkeltordene og sætter dem sammen øh hvad enten det passer sammen eller ej

KB: ja

H: øh og jj alt efter hvad det er for nogle tekster ... så ka' man jo støde på sådan nogen segmenter der ... øh eller præoversættelser i højere eller mindre grad

KB: mm-mm

H: øh og det er sådan nogen vi gerne sådan griner lidt af ... øh men den **den sætning** ... øh ... ku' jeg ikke bruge til ret meget

KB: [nej okay]

H: [det der med] de "akustiske nyskabelser" det tænkte jeg faktisk det er sku' okay

KB: ja

H: øh men eller så ku' jeg faktisk ikk' bruge selve **sætningen** til noget

KB: nej okay

H: men men øh

KB: så der [retter du lige]

H: [det er jo] heldigvis ikke hver gang det er sådan

KB: nej nej ... så der ender du nok med og rette en del [til som]

H: [ja det gør jeg]

KB: ja

Step 2:

Uses the termbase search to search for "brand". Selects "the brand's" in the source segment and runs a concordance search. Writes "Derfor kan kunderne nu opleve Bang & Olufsens" in the beginning of the segment. Deletes "Opleve den brand".

Derfor kan kunderne nu opleve Bang & Olufsens akustiske nyskabelser det har aldrig været nemmere lydfronten.

App. X, H, ll. 545-575:

H: ja så ska' jeg søge på om det hedder "brand" eller "varemærke" for der får jeg to forslag

KB: mm

H: og så konkordanssøger jeg igen for at finde ud af hvad de oftest burger

KB: ja okay

H: mm-mm (pause) ... og så er det også noget med nu ved jeg ikke hvordan det der er sat op men der er et eller andet med at sådan som vores setup er lige nu der ka' de ikke vise forbiddne terms de blir' bare vist som en term ... som en valid term men i virkeligheden ku' den ene af de to termer der godt være forbiddne

KB: okay

H: det er lige noget vi arbejder på her i huset og få det lavet om fordi det ka' jo ikk' nytte noget at det står ... som om de har den samme status hvis den ene er den man **bare** ikk' må bruge

KB: og der ka' godt være en der ligger i termbasen som er
H: ja
KB: er forbudt og bruge?
H: ja
KB: ja ... hvorfor vil den så ligge der?
H: jamen det er jo fordi at nogle gange så er der noget det altså det er vigtigt og vide at den ska' man aldrig bruge den her så hvis man kommer i tanke om [at skrive det]
KB: [nårh]
H: så ska' man i hvert fald la' være med det
KB: ja
H: men det det det fordrer jo ligesom at det er indikeret
KB: ja [at det ja]
H: [ikk' også] så det er vi ved at arbejde lidt på
KB: okay
H: så derfor er jeg også lige lidt i tvivl
KB: ja
H: og jeg ved nemlig det har været et problem med den der B&O-termbase så derfor er jeg lige lidt skeptisk der

Step 3:

Selects "first-hand" in the source segment and runs a concordance search. Selects "compelling" in the source segment and runs a concordance search. Writes "er det nu blevet endnu" before "kan", deletes "r", writes "lettere d". Deletes "d", writes "for". Deletes "kan".

Derfor er det nu blevet endnu lettere for kunderne nu opleve Bang & Olufsens akustiske nyskabelser det har aldrig været nemmere lydfrenten.

App. X, H, ll. 576-615:

KB: sådan lidt øh ... ja mere obs ... ja okay og så laver du den faktisk øh
H: ja og det der er faktisk sådan lidt en ... det er også øh ... en ting er at det er lidt svært for ...
oversættelsesværktøjet og oversætte den det er også lidt svært for oversætteren fordi det er faktisk lige sådan
en sætning man lige ska' sidde og tænke lidt over og vende og dreje lidt
KB: ja
H: så den tar lidt langt tid og lave og det ... det er simpelthen bare sætningens karakter og det er ikk' på grund af
... det forslag jeg har fået jo det er også på grund af det men
KB: ja
H: jeg ville ha' siddet og brugt tid på den det segment alligevel
KB: okay
H: hvis jeg skulle oversætte den fra bundet af
KB: ja
H: ja
KB: så der der ... der øh så ender du med og bruge "Bang og Olufsen" og også lave en noget andet struktur
H: ja
KB: ja
H: jamen den sidder jeg længe og arbejder med den sætning
KB: ja okay
H: fordi der er vi jo ude i sådan noget der lige ska' lyde sådan lidt smart og lidt lækkert og ... som ska' lokke
kunderne ind i butikken og sådan noget så der er man nødt til lige at tænke sig lidt om
KB: ja
H: ja
KB: ja okay
H: og det er det jeg tænker at det ... det det det er der sådan hvor det menneskelige aspekt kommer ind
KB: ja
H: altså man ka' få rigtig meget hjælp sådan til til det der det trivielle men men ... for lige og få det vendt så det
lyder rigtig godt
KB: ja
H: det ka' man jo ikk' få hjælp til så det det ka' være det ka' være en fin kombination at man netop får hjælp til alt
det trivielle og så ka' man bruge tiden på og
KB: på at lave det mere
H: [ja]
KB: [ja]
H: ja
KB: kreative eller [ja]
H: [ja] ja netop

Step 4:

Selects "nu" and deletes it by writing "at". Selects "det har aldrig været nemmere lydfronten" and deletes it.
Derfor er det nu blevet endnu lettere for kunderne at opleve Bang & Olufsens akustiske nyskabelser.

EXAMPLE 20-FAQ-E-61:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator E	61	MT	Revise	Match-external	Google search + Concordance search
Source text segment		Disconnect [tag]BeoLab 14[tag] from the mains, then reconnect it to the main again.			

Step 1 – Provided match:

Afbryd[tag] BeoLab 14[tag] fra lysnet, og sæt den i igen.

Step 2:

Goes to Google and searches for "beolab 14". Goes to "Google Images". Selects "reconnect" in the source segment and runs a concordance search.

Afbryd[tag] BeoLab 14[tag] fra lysnet, og sæt den i igen.

App. X, E, ll. 289-303:

E: ja jeg søger på beolab 14

KB: [okay]

E: [fordi] jeg lige pludselig tænker ved mig selv jeg ku' da godt tænke mig at se hvad det var for en fætter

KB: ja

E: fordi at ... jeg ka' ikk' huske om det var der jeg kom i tvivl om ... om det egentlig var en højttaler ... eller om det var noget andet

KB: [ja]

E: [der] står i hvert fald et eller andet sted i teksten ... der bliver den omtalt som din beolab 14 eller min beolab 14 og så tænkte jeg lige pludselig ved mig selv om ... om det egentlig ... var noget andet end en højttaler så det sku' hedde mit eller dit

KB: ja

E: [så]

KB: [okay] ... så det var derfor du søgte

E: ja

Step 3:

Places the cursor before "sæt" and writes "tis", deletes "s", writes "Islut". Deletes "sæt". Deletes "i".

Afbryd[tag] BeoLab 14[tag] fra lysnet, og tilslut den igen.

EXAMPLE 21-NL-D-13:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator D	13	MT	Revise	Match-external	Concordance search + Google search + Web page
Source text segment		The new retail concept will be launched in Bang & Olufsen's new flagship store in Copenhagen on 18 April.			

Step 1 – Provided match:

Det nye designkoncept lanceres i Bang & Olufsen's nye flagskib gemme i København den 18. april.

Step 2:

Selects "flagship store" in the source segment and runs a concordance search. Selects "gemme" and deletes it.

Det nye designkoncept lanceres i Bang & Olufsen's nye flagskib i København den 18. april.

Step 3:

Goes to Google and runs a search for "flagskibsbutik". Clicks on the title "Se billederne: Her er B&O's nye flagskibsbutik i København". Returns to the translation file and writes "sbutik" at the end of "flagskib".

Det nye designkoncept lanceres i Bang & Olufsen's nye flagskibsbutik i København den 18. april.

EXAMPLE 22-FAQ-H-23-25:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator H	23	MT	Revise	Match-external	Reference text + Concordance search x 3
Source text segment		How should I set the bass position knob (FREE, WALL, CORNER) on BeoLab 14?			

Step 1 – Provided match:

Hvordan skal jeg indstille bass positionsknappen (FRI , WALL , HJØRNE) på BeoLab 14 ?

Step 2:

Finds the corresponding spot in the reference text. Selects "bass position knob" in the source segment and runs a concordance search. The translator deletes "bass" in the concordance search window and runs a search for "position knob". The translator deletes "position" in the concordance search window and runs a search for "knob".

Hvordan skal jeg indstille bass positionsknappen (FRI , WALL , HJØRNE) på BeoLab 14 ?

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator H	24	79%	Revise	Match-internal	N/A
Source text segment		The setting of the bass position knob is based on the number of surfaces the subwoofer is in close proximity of.			

Step 1 – Provided match:

Indstillingen af omskifteren POS. afhænger af det antal overflader, som subwooferen står i nærheden af (inden for 50 cm).

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator H	25	98%	Revise	Match-external	Concordance search + Local dictionary x 4 + Google search x 6
Source text segment		Use the position knob to filter out the natural bass change obtained if the subwoofer is placed, for example, in a corner, as compared to a more freestanding position.			

Step 1 – Provided match:

Brug positionsomskifteren til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.

Step 2:

Selects "position knob" in the source segment and runs a concordance search. The translator opens a local dictionary (Gyldendals Røde Ordbøger) and searches for "position knob". The translator then searches for "knob". The translator opens another local dictionary (L&H Engelsk) and searches for "position knob". The translator searches for "knob". The translator goes to Google and searches for "basknap". Searches for "basknappen". Searches for "baspositionsknappen". Searches for "beolab 14 basknap". Searches for "beolab 14 baspositionsknap". Searches for "beolab baspositionsknap".

Brug positionsomskifteren til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.

App. X, H, II. 159-213:

H: øh i øh ... det er der hvor jeg støder på det der "bass position knob" første gang

KB: ja

H: og det ka' jeg ikk' finde i konkordansen (pause) øhm ja og så laver jeg noget google-søgning på hva' det mon ka' hedde

KB: ja

H: ja

KB: okay

H: og jeg slår op i ordbøger også

KB: ja og ka' du huske noget om hva' du ... hva' du kom frem til vi ka' måske lige prøve og se når den kommer hen til google-søgningen gør den nok det gør den nok lige om lidt

H: ja armen ja jeg endte med at det bare sku' hedder "basknappen" fordi så begynder jeg og søge på øh ... jeg tror jeg begynder og søge (pause) på nogle forskellige forslag på dansk sammen med ... Bang og Olufsen

KB: ja

H: for og se hvad de burger

KB: ja

H: mm

KB: og så så du noget med at de brugte "basknappen"

H: ja

KB: ja

H: jah altså det var ikk' lige sådan en det var ikke sådan en term hvor man tænker "ej den er der bare 4.000 hits på

KB: nej

H: den napper [jeg lige]"

KB: [() perfekt]

H: men det er nok fordi man sådan ... selv tænker "baspositionsknappen" det lyder sådan rimelig træls

KB: ja

H: det hedder nok bare "basknappen"

KB: ja det gør du der ka' jeg se

H: ja men det det der er en masse udenlandske hjemmesider

KB: ja

KB: nårh og så prøver du med ["baspositionsknappen"]

H: [ja ... ja]

KB: ja

H: og det er typisk hvis det er en hvis det er et område som man ikke er så godt kendt med så vil man typisk prøve og lave sådan nogle søgninger der

KB: [ja ja ja]

H: [og så se] ... øhm (pause) der sidder man jo tit og tænker på hva' man ville ha' gjort hvis man ikk' havde haft internettet

KB: ja

KB: latter

H: [der var man jo på den ()]

KB: [så havde man øh] ... haft problemer ja

H: ja

KB: okay nu ska' jeg prøve og se her så (pause) øhm

H: nårh ja jeg søgte på beolab 14 det er rigtigt og basknappen

KB: okay

H: ja

KB: finder du så noget der måske

H: ja

KB: ja

H: det bliver sådan noget altså det er folk der sælger noget så det er jo ikk' sådan hel

KB: narh men

H: på den blå avis og sådan noget det er jo ikk' sådan hel ... validt men altså

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator H	23	MT	Revise	Match-external	Reference text + Concordance search x 3
Source text segment		How should I set the bass position knob (FREE, WALL, CORNER) on BeoLab 14?			

Step 1 – Provided match:

Hvordan skal jeg indstille bass positionsknappen (FRI , WALL , HJØRNE) på BeoLab 14 ?

Step 2:

Places the cursor between "bas" and "s" in "bass". Writes "knappen". Selects "s positionsknappen" and deletes it.

Hvordan skal jeg indstille basknappen (FRI , WALL , HJØRNE) på BeoLab 14 ?

Step 3:

Deletes the space between "(" and "FRI". Places the cursor between "FR" and "I" in "FRI" and writes "EE". Deletes "I".

Hvordan skal jeg indstille basknappen (FREE, WALL , HJØRNE) på BeoLab 14 ?

Step 4:

Deletes the space between "WALL" and the comma. Places the cursor before "HJØRNE" and writes "CORNER".

Deletes "HJØRNE" and the space between "CORNER" and ")". Deletes the space between "14" and "?".

Hvordan skal jeg indstille basknappen (FREE, WALL, CORNER) på BeoLab 14?

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator H	24	79%	Revise	Match-internal	N/A
Source text segment		The setting of the bass position knob is based on the number of surfaces the subwoofer is in close proximity of.			

Step 1 – Provided match:

Indstillingen af omskifteren POS. afhænger af det antal overflader, som subwooferen står i nærheden af (inden for 50 cm).

Step 2:

Places the cursor before "omskifteren" and writes "basknappen". When writing "basknappen", the translator is offered "base" by the AutoSuggest function, but does not use it. Deletes "omskifteren POS.". Deletes "(inden for 50 cm)". Inserts a full stop after "af".

Indstillingen af basknappen afhænger af det antal overflader, som subwooferen står i nærheden af.

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator H	25	98%	Revise	Match-external	Concordance search + Local dictionary x 4 + Google search x 6
Source text segment		Use the position knob to filter out the natural bass change obtained if the subwoofer is placed, for example, in a corner, as compared to a more freestanding position.			

Step 1 – Provided match:

Brug positionsomskifteren til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.

Step 2:

Places the cursor before "positionsomskifteren" and writes "base", deletes "e", writes "ka", deletes "a", writes "nappen". Deletes "positionsomskifteren".

Brug **basknappen** til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.

Step 3:

Writes "nat" between "bortfiltrere" and "ændringer", deletes "t", writes "turlige".

Brug **basknappen** til at bortfiltrere **naturlige** ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.

EXAMPLE 23-NL-A-3:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator A	3	94%	Revise	Match-external	Concordance search + Online dictionary
Source text segment		Bang & Olufsen has announced a new partnership with Spotify, the world's leading music streaming service.			

Step 1 – Provided match:

Bang & Olufsen har indgået et samarbejde med Spotify, verdens førende udbyder af musikstreaming.

Step 2:

Selects "announced" in the source segment and runs a concordance search. Selects "indgået" in the target segment. Goes to the online dictionary www.ordbogen.com and looks up "announce". Deletes "indgået" and writes "offentliggjort". Writes "nyt".

Bang & Olufsen har **offentliggjort** et **nyt** samarbejde med Spotify, verdens førende udbyder af musikstreaming.

EXAMPLE 24-FAQ-H-28:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator H	28	100 %	Revise	Match-external	Reference text
Source text segment		Shown by light grey areas in the illustration.			

Step 1 – Provided match:

Dette viser de lysegrå områder i illustrationen ovenfor.

Step 2:

Consults the corresponding spot in the reference text.

Dette viser de lysegrå områder i illustrationen ovenfor.

Step 3:

Returns to this segment after having made a change in segment 31. Writes "er vist ved" between "Dette" and "viser". Deletes "viser". Deletes "ovenfor".

Dette **er vist ved** de lysegrå områder i illustrationen.

Step 4:

Returns to this segment after having entered segment 34. Deletes "v" in "ved" and writes "m".

Dette er vist **med** de lysegrå områder i illustrationen.

EXAMPLE 25-FAQ-H-21:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator H	21	MT	Revise	Match-external	Pasting element copied from the source segment
Source text segment		For information about more advanced sound settings, see the Technical Sound Guide .			

Step 1 – Provided match:

Se oplysninger om mere avancerede lydindstillinger, se Tekniske **lyd Vejledning**.

Step 2:

Deletes "Se o" and writes "O". Writes "fubdes" after "lydindstillinger", deletes "ubdes", writes "indes i". Deletes ", se".

Oplysninger om mere avancerede lydindstillinger findes i Tekniske **lyd Vejledning**.

App. X, H, II. 80-98:

KB: ja ... jeg tænkte også på der i udgangsteksten så står der "for information about more advanced sound settings"

H: [ja]

KB: [og der] stod så ... der stod "se oplysninger ... om ... mere avancerede lydindstillinger i" tror jeg først i forslaget

H: ja ... øh og og det vil man jo egentlig øhm ... det vil man jo egentlig også fint ku' bruge men jeg tror at der laver jeg det om ... til til en en passiv sætning for også ligesom og variere sproget lidt

KB: ja [okay]

H: [fordi] jeg synes meget når man arbejder med med maskinoversættelse det er meget ord for ord oversættelse og og faktisk så ka' det godt være nogen ... det ka' godt være nogen fine formfuldendte sætninger isoleret set

KB: ja

H: men hvis det ska' være noget der lige ska' flyde lidt så er man nødt til nogen gange lige og [omformulere ()]

KB: [og ændre lidt]

H: ja

KB: ja

H: i forhold til det der stod som udgangspunkt

Step 3:

Selects "Technical Sound Guide" in the source segment and copies it. Inserts it after "i" in the target segment.

Oplysninger om mere avancerede lydindstillinger findes i **Technical Sound Guide** Tekniske lyd Vejledning.

App. X, H, II. 74-79:

H: (pause) øh ja der tænker jeg jo at det med rødt det ska' ikk' oversættes og det har

KB: nej

H: den jo så ... altså øhm ... øh ... maskinoversættelsesværktøjer har jo oversat noget som ikk' sku' oversættes

KB: ja

H: og derfor kopierer jeg det så fra ... øh kildesegmentet og sætter det ind i målsegmentet

Step 4:

Deletes "Tekniske lyd Vejledning.". Inserts a full stop after "Guide".

Oplysninger om mere avancerede lydindstillinger findes i **Technical Sound Guide**.

EXAMPLE 26-NL-E-23:

Translator	Segment number	Match type	Accept/Reject/Revise	Match-internal/Match-external	Match-external actions
Translator E	23	MT	Revise	Match-external	Pasting element copied from another segment
Source text segment		Against more than 4000 competing products and projects from 54 countries, BeoPlay V1 took home the winning prize with the coveted red dot award for product design 2013.			

Step 1 – Provided match:

I en konkurrence med over 4.000 produkter fra 54 lande BeoPlay V1 tog af med rød prik prisen for bedste produkt design i 2013.

Step 2:

Writes "og projekter " between "produkter" and "fra". Writes "vandt" between "lande" and "BeoPlay". Deletes "tog af med".

I en konkurrence med over 4.000 produkter og projekter fra 54 lande vandt BeoPlay V1 rød prik prisen for bedste produkt design i 2013.

App. X, E, II. 553-556:

E: øhm (pause) nej jeg tænkte jeg ku' bruge alt det første ... øh ... og så fra der took home the winning prize så sku' jeg lige ændre lidt

KB: ja

E: men ellers ... ja jeg ku' egentlig godt bruge rimelig meget af det

Step 3:

Returns to this segment after having entered segment 22 and copied "den eftertragtede red dot award". Inserts "den eftertragtede red dot award" before "rød". Inserts a space between "award" and "rød". Deletes "rød prik prisen".

I en konkurrence med over 4.000 produkter og projekter fra 54 lande vandt BeoPlay V1 den eftertragtede red dot award for bedste produkt design i 2013.

Appendix 7. Match-external actions for all translators

FAQ text

Translator A

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy Source to Target		Copy/Cut → Copy Source to Target → Insert		Termbase search		Google search		Search in online dictionary		Search in local dictionary		Reference text		Pasting element copied from another segment		Pasting element copied from the source segment	
100%	0	0																				
95-99%	1	1	0	0%	0	0%	0	0%	0	0%	0	0.0%	0	0%	0	0%	1	100%	0	0%	0	0%
85-94%	2	2	1	50.0%	0	0%	0	0%	0	0%	0	0.0%	0	0%	0	0%	0	0%	0	0%	1	50.0%
75-84%	0	0																				
70-74%	3	8	3	37.5%	0	0%	0	0%	0	0%	0	0.0%	0	0%	0	0%	1	12.5%	0	0%	4	50.0%
MT	24	58	47	81.0%	0	0%	0	0%	0	0%	4	6.9%	1	1.7%	2	3.4%	2	3.4%	1	1.7%	1	1.7%
In total	30	69	51	73.9%	0	0%	0	0%	0	0%	4	5.8%	1	1.4%	2	2.9%	4	5.8%	1	1.4%	6	8.7%

Translator B

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy Source to Target		Copy/Cut → Copy Source to Target → Insert		Termbase search		Google search		Search in online dictionary		Search in local dictionary		Reference text		Pasting element copied from another segment		Pasting element copied from the source segment	
100%	0	0																				
95-99%	0	0																				
85-94%	1	3	1	33.3%	0	0%	0	0%	1	33.3%	0	0%	0	0%	0	0%	1	33.3%	0	0%	0	0%
75-84%	0	0																				
70-74%	2	3	1	33.3%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	33.3%	1	33.3%
MT	8	14	10	71.4%	1	7.1%	0	0%	0	0%	1	7.1%	0	0%	0	0%	0	0%	0	0%	2	14.3%
In total	11	20	12	60.0%	1	5.0%	0	0%	1	5.0%	1	5.0%	0	0%	0	0%	1	5.0%	1	5.0%	3	15.0%

Translator C

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy Source to Target		Copy/Cut → Copy Source to Target → Insert	Termbase search		Google search		Search in online dictionary		Search in local dictionary		Reference text		Pasting element copied from another segment		Pasting element copied from the source segment	
100%	1	1	0	0%	0	0%	0	0%	0	0	0%	0	0%	0	0%	1	100%	0	0%	0	0%
95-99%	0	0																			
85-94%	1	1	1	100%	0	0%	0	0%	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
75-84%	0	0																			
70-74%	2	2	0	0%	0	0%	2	100%	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
MT	9	12	9	75.0%	0	0%	1	8.3%	0	0	0%	0	0%	0	0%	1	8.3%	0	0%	1	8.3%
In total	13	16	10	62.5%	0	0%	3	18.8%	0	0	0%	0	0%	0	0%	2	12.5%	0	0%	1	6.3%

Translator D

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy Source to Target		Copy/Cut → Copy Source to Target → Insert	Termbase search		Google search		Search in online dictionary		Search in local dictionary		Reference text		Pasting element copied from another segment		Pasting element copied from the source segment	
100%	0	0																			
95-99%	2	2	1	50.0%	1	50.0%	0	0%	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0
85-94%	2	3	2	66.7%	0	0%	1	33.3%	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0
75-84%	1	1	0	0%	0	0%	1	100.0%	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0
70-74%	2	2	0	0%	0	0%	2	100.0%	0	0	0%	0	0%	0	0%	0	0%	0	0%	0	0
MT	9	11	3	27.3%	0	0%	3	27.3%	0	0	0%	0	0%	0	0%	0	0%	0	0%	5	45.5%
In total	16	19	6	31.6%	1	5.3%	7	36.8%	0	0	0%	0	0%	0	0%	0	0%	0	0%	5	26.3%

Translator E

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy Source to Target	Copy/Cut → Copy Source to Target → Insert	Termbase search	Google search		Search in online dictionary		Search in local dictionary		Reference text		Pasting element copied from another segment		Pasting element copied from the source segment	
100%	0	0																	
95-99%	1	2	0	0%	0	0%	0	0%	2	100.0%	0	0%	0	0	0%	0	0%	0	0%
85-94%	2	2	2	100.0%	0	0%	0	0%	0	0%	0	0%	0	0	0%	0	0%	0	0%
75-84%	2	2	1	50.0%	0	0%	0	0%	0	0%	0	0%	0	0	0%	0	0%	0	0%
70-74%	2	3	1	33.3%	0	0%	0	0%	0	0%	0	0%	0	0	0%	0	0%	0	0%
MT	15	36	18	50.0%	2	5.6%	0	0%	9	25.0%	0	0%	0	0	0%	0	0%	0	0%
In total	22	45	22	48.9%	2	4.4%	0	0%	11	24.4%	0	0%	0	0	0%	0	0%	0	0%

Translator G

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy Source to Target	Copy/Cut → Copy Source to Target → Insert	Termbase search	Google search		Search in online dictionary		Search in local dictionary		Reference text		Pasting element copied from another segment		Pasting element copied from the source segment	
100%	2	2	0	0%	0	0%	0	0%	0	0%	0	0%	0	0	0%	2	100.0%	0	0%
95-99%	0	0																	
85-94%	1	1	1	100.0%	0	0%	0	0%	0	0%	0	0%	0	0	0%	0	0%	0	0%
75-84%	1	1	0	0%	0	0%	0	0%	0	0%	0	0%	0	0	0%	0	0%	0	0%
70-74%	2	2	0	0%	0	0%	0	0%	0	0%	0	0%	0	0	0%	0	0%	0	0%
MT	17	21	6	28.6%	0	0%	0	0%	0	0%	0	0%	0	4	19.0%	0	0%	0	0%
In total	23	27	7	25.9%	0	0%	0	0%	0	0%	0	0%	0	4	14.8%	2	7.4%	0	0%

Translator H

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy Source to Target		Copy/Cut → Copy Source to Target → Insert		Termbase search		Google search		Search in online dictionary		Search in local dictionary		Reference text		Pasting element copied from another segment		Pasting element copied from the source segment	
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100%	1	1																1	100.0%	0	0	0%
95-99%	1	11	1	9.1%	0	0%	0	0%	0	0%	6	54.5%	0	0%	4	36.4%	0	0%	0	0%	0	0%
85-94%	1	1	1	100.0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
75-84%	1	1	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	100.0%
70-74%	1	3	3	100.0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
MT	20	31	21	67.7%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	4	12.9%	0	0%	6	19.4%
In total	25	48	26	54.2%	0	0%	0	0%	0	0%	6	12.5%	0	0%	4	8.3%	5	10.4%	0	0%	7	14.6%

Newsletter

Translator A

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search	Copy/Cut → Copy Source to Target → Insert	Termbase search	Google search	Web page	Search in online dictionary	Search in local dictionary	Pasting element copied from another segment
100%	0	0								
95-99%	0	0								
85-94%	1	2	1	0	0	0	0	1	0	0
75-84%	2	2	1	0	0	0	0	0	0	1
70-74%	0	0								
MT	11	35	33	0	0	0	0	2	0	0
In total	14	39	35	0	0	0	0	3	0	1
										2.6%

Translator B

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search	Copy/Cut → Copy Source to Target → Insert	Termbase search	Google search	Web page	Search in online dictionary	Search in local dictionary	Pasting element copied from another segment
100%	0	0								
95-99%	0	0								
85-94%	0	0								
75-84%	1	1	1	0	0	0	0	0	0	0
70-74%	1	1	1	0	0	0	0	0	0	0
MT	5	8	4	0	0	3	0	0	0	1
In total	7	10	6	0	0	3	0	0	0	1
										10.0%

Translator C

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search	Copy/Cut → Copy Source to Target → Insert	Termbase search	Google search	Web page	Search in online dictionary	Search in local dictionary	Pasting element copied from another segment
100%	0	0								
95-99%	0	0								
85-94%	1	1	1	0	0	0	0	0	0	0
75-84%	0	0								
70-74%	0	0								
MT	7	13	11	0	0	0	0	0	0	2
In total	8	14	12	0	0	0	0	0	0	2
										15.4%
										14.3%

Translator D

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search	Copy/Cut → Copy Source to Target → Insert	Termbase search	Google search	Web page	Search in online dictionary	Search in local dictionary	Pasting element copied from another segment
100%	0	0								
95-99%	0	0								
85-94%	0	0								
75-84%	0	0								
70-74%	0	0								
MT	5	9	3	0	0	3	2	0	0	1
In total	5	9	3	0	0	3	2	0	0	1
										11.1%
										11.1%

Translator E

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy/Cut → Copy Source to Target → Insert	Termbase search	Google search	Web page		Search in online dictionary		Search in local dictionary		Pasting element copied from another segment
100%	0	0												
95-99%	0	0												
85-94%	0	0												
75-84%	3	3	3	100.0%	0	0%	0	0%	0	0	0%	0	0%	0%
70-74%	1	1	1	100.0%	0	0%	0	0%	0	0	0%	0	0%	0%
MT	8	17	8	47.1%	0	0%	6	35.3%	1	5.9%	0	0	0%	11.8%
In total	12	21	12	57.1%	0	0%	6	28.6%	1	4.8%	0	0	0%	9.5%

Translator G

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy/Cut → Copy Source to Target → Insert	Termbase search	Google search	Web page		Search in online dictionary		Search in local dictionary		Pasting element copied from another segment
100%	0	0												
95-99%	0	0												
85-94%	0	0												
75-84%	1	1	1	100.0%	0	0%	0	0%	0	0	0%	0	0%	0%
70-74%	1	1	0	0%	0	0%	1	100.0%	0	0	0%	0	0%	0%
MT	5	7	2	28.6%	1	0%	1	14.3%	0	0%	0	0	0%	42.9%
In total	7	9	3	33.3%	1	0%	2	22.2%	0	0%	0	0	0%	33.3%

Translator H

Match type	Matches revised by means of match-external revision	Match-external actions in total	Concordance search		Copy/Cut → Copy Source to Target → Insert		Termbase search		Google search		Web page		Search in online dictionary		Search in local dictionary		Pasting element copied from another segment	
100%	1	1	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	100.0%	0	0%
95-99%	0	0																
85-94%	0	0																
75-84%	2	2	0	0.0%	0	0%	0	0%	2	100.0%	0	0%	0	0%	0	0%	0	0%
70-74%	0	0																
MT	7	20	13	65.0%	0	0%	1	5.0%	5	25.0%	0	0%	0	0%	0	0%	1	5.0%
In total	10	23	13	56.5%	0	0%	1	4.3%	7	30.4%	0	0%	0	0%	1	4.3%	1	4.3%

Appendix 8. Changes implemented during the checking phase

Checking of the FAQ text

Translator	Segment number	Match type	Source segment	Target segment before checking	Target segment after checking	Description of change	Categorization	Number of changes
A	12	99%	BeoVision 7-40/55	BeoVision 7-40/55.	BeoVision 7-40/55	Full stop is deleted.	Essential	1
A	33	100%	Use this setting if the subwoofer is placed close to three surfaces (in a corner).	Brug denne indstilling, hvis subwooferen er placeret tæt på tre overflader (i et hjørne).	Brug denne indstilling, hvis subwooferen er placeret tæt på tre overflader: i et hjørne.	A colon is inserted after "overflader" and the parentheses around "i et hjørne" are deleted.	Preferential	1
A	40	MT	If the noise on the LINE or AMP signal is too high, the BeoLab 14 will detect this as sound and not switch off.	Hvis støjen på LINE eller AMP-signalet er for høj, vil BeoLab 14 registrere dette som lyd og ikke slukke.	Hvis støjen på LINE eller AMP-signalet er for høj, vil BeoLab 14 registrere dette som lyd og ikke slukke.	An "r" is inserted in "registrere".	Essential	1
A	64	MT	Reduce the volume level and wait some time until the product returns to normal.	Reducer lydstyrken, og vent lidt, indtil produktet vender tilbage til normaltilstand.	Reducer lydstyrken, og vent, indtil produktet vender tilbage til normaltilstand.	"lidt" is deleted.	Preferential	1
A	71	80%	For more information, see the Technical Sound Guide.	Yderligere plysninger findes i hurtigvejledningen.	Yderligere lysninger findes i hurtigvejledningen.	"plysninger" is changed to "lysninger"	Essential	1
C	2	MT	When I set up [tag]BeoLab 14[tag], should I use PL-A (PL1) or PL-B (PL-2)?	Når jeg opsætter [tag]BeoLab 14[tag], skal jeg anvende PL-A (PL1) eller PL-B (PL-2)?	Når jeg opsætter [tag]BeoLab 14[tag], skal jeg anvende PL-A (PL1) eller PL-B (PL-2)?	Change(s) in space(s) around tag(s).	Essential	1
C	15	MT	Note that 'BeoLab 14' may not be available in the [tag]SPEAKER TYPE[tag] menu.	Bemærk, at 'BeoLab 14' ikke er tilgængelig i [tag]SPEAKER TYPE[tag] menuen.	Bemærk, at 'BeoLab 14' ikke er tilgængelig i [tag]SPEAKER TYPE[tag] menuen.	Change(s) in space(s) around tag(s).	Essential	1
C	28	100%	Shown by light grey areas in the illustration.	Dette viser de lysegrå områder i illustrationen ovenfor.	Det er vist med de lysegrå områder i illustrationen ovenfor.	"Dette viser" is changed to "Det er vist med".	Preferential	1
C	39	MT	Why does my BeoLab 14 not switch to standby after 3 minutes with no sound, when the MODE switch is set to LINE or AMP?	Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, når [tag]MODE[tag] omskifteren er indstillet til [tag]LINE[tag] eller [tag]AMP[tag]?	Hvorfor skifter min [tag]BeoLab 14[tag] ikke til standby efter 3 minutter uden lyd, når [tag]MODE[tag] omskifteren er indstillet til [tag]LINE[tag] eller [tag]AMP[tag]?	Change(s) in space(s) around tag(s).	Essential	1
C	61	MT	Disconnect [tag]BeoLab 14[tag] from the mains, then reconnect it to the main again.	Afbryd strømmen til [tag]BeoLab 14[tag], og tilslut den derefter igen.	Afbryd strømmen til [tag]BeoLab 14[tag], og tilslut den derefter igen.	Change(s) in space(s) around tag(s).	Essential	1
D	2	MT	When I set up BeoLab 14, should I use PL-A (PL1) or PL-B	I opsætningen af BeoLab 14, skal jeg da anvende PL-A (PL1)	Skal jeg i opsætningen af BeoLab 14 anvende PL-A (PL1)	"I [...] skal jeg da" is changed to "Skal jeg i [...]".	Preferential	1

D	3	MT	(PL-2)? Which MODE setting to use depends on the type of your Bang & Olufsen television.	eller PL-B (PL-2)? MODE-indstillingen afhænger af dit Bang & Olufsen-fjernsyn.	eller PL-B (PL-2)? MODE-indstillingen afhænger af, hvilket Bang & Olufsen-fjernsyn du har.		Preferential	1
D	4	MT	See below table to find out which MODE setting to use:	Se tabellen nedenfor for at finde ud af, hvilken MODE indstilling du skal anvende:	I tabellen nedenfor kan du se, hvilken MODE indstilling du skal anvende:	"Se [...] for at finde ud af" is changed to "I [...] kan du se".	Preferential	1
D	5	MT	PL-A (PL1)	PL- (PL1)	PL-A (PL1)	"A" is inserted.	Essential	1
D	14	MT	TVs with Din Power Link sockets:	Fjernsyn med DIN Power Link-stik:	Fjernsyn med DIN-Power Link-stik:	Hyphen is inserted between "DIN" and "Power".	Preferential	1
D	16	91%	See the Quick guide for more information.	Se yderligere oplysninger i den korte vejledning.	Se yderligere oplysninger i den korte vejledning (Quick guide).	"(Quick guide)" is written after "vejledning".	Preferential	1
D	21	MT	For information about more advanced sound settings, see the Technical Sound Guide.	For oplysninger om mere avancerede lydindstillinger se Technical Sound Guide.	Oplysninger om mere avancerede lydindstillinger findes i Technical Sound Guide.	"For [...] se [...]" is changed to "[...] findes i [...]" .	Preferential	1
D	25	98%	Use the position knob to filter out the natural bass change obtained if the subwoofer is placed, for example, in a corner, as compared to a more freestanding position.	Brug placeringsknappen til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.	Brug placeringsknappen til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for fritstående.	"frit" is changed to "fritstående".	Preferential	1
D	34	99%	Shown by the dark grey areas in the illustration.	Det er vist med de mørkegrå områder i illustrationen.	Dette er vist med de mørkegrå områder i illustrationen.	"Det" is changed to "Dette".	Preferential	1
D	41	MT	To avoid noise on the [tag]LINE[tag] or [tag]AMP[tag] signal make sure that you have connected all sockets on [tag]BeoLab 14[tag] to the corresponding sockets on the connected product.[tag]	For at undgå støj på [tag]LINE[tag]- eller [tag]AMP[tag]-signalet [tag] skal du sørge for, at alle stik på [tag] BeoLab 14[tag] er tilsluttet de tilsvarende stik på det tilsluttede produkt. [tag]	For at undgå støj på [tag]LINE[tag]- eller [tag]AMP[tag]-signalet [tag] skal du sørge for, at alle stik på [tag] BeoLab 14[tag] er tilsluttet de tilsvarende stik på det tilsluttede produkt. [tag]	Change(s) in space(s) around tag(s).	Essential	2
D	61	MT	Disconnect [tag]BeoLab 14[tag] from the mains, then reconnect it to the main again.	Afbyrd [tag] BeoLab 14[tag] fra lysnettet, og tilslut den igen.	Afbyrd [tag] BeoLab 14[tag] fra lysnettet, og tilslut den igen.	Change(s) in space(s) around tag(s).	Essential	1
D	64	MT	Reduce the volume level and wait some time until the product returns to normal.	Reducer lydstyrken, og vent et stykke tid, indtil produktet vender tilbage til normal tilstand.	Reducer lydstyrken, og vent et øjeblik, indtil produktet vender tilbage til normal tilstand.	"stykke tid" is changed to "øjeblik".	Preferential	1
D	68	MT	Is the surround sound processor integrated in BeoLab 14?	Er surroundsound-processor integreret i BeoLab 14 ?	Er surroundsound-processor integreret i BeoLab 14?	The space between "14" and "?" is deleted.	Essential	1
E	41	MT	To avoid noise on the LINE or AMP signal make sure that you have connected all sockets on BeoLab 14 to the corresponding sockets on the	For at undgå støj på LINE- eller AMP-signalet skal sørge for, at du har tilsluttet alle stik på BeoLab 14 til de tilsvarende stik på det tilsluttede produkt.	For at undgå støj på LINE- eller AMP-signalet skal du sørge for, at du har tilsluttet alle stik på BeoLab 14 til de tilsvarende stik på det tilsluttede produkt.	"du" is written between "skal" and "sørge".	Essential	1

E	52			connected product.	Do not disconnect Beolab 14 from the mains during the software update.	Afbyrd ikke Beolab 14 fra lysnet under softwareopdatering.	Afbyrd ikke Beolab 14 fra lysnet under softwareopdatering.	"lysnet" is changed to "lysnettet".	Preferential	1	
E	61	20-FAQ-E-61	MT		Disconnect Beolab 14 from the mains, then reconnect it to the main again.	Afbyrd Beolab 14 fra lysnet, og tilsut den igen.	Afbyrd Beolab 14 fra lysnettet, og tilsut den igen.	"lysnet" is changed to "lysnettet".	Preferential	1	
G	2		MT		When I set up Beolab 14, should I use PL-A (PL1) or PL-B (PL-2)?	Skal jeg anvende PL-A (PL1) eller PL-B (PL-2), når jeg sætter Beolab 14 op?	Skal jeg anvende PL-A (PL1) eller PL-B (PL2), når jeg sætter Beolab 14 op?	The hyphen in "(PL-2)" is deleted.	Preferential	1	
G	40		MT		If the noise on the LINE or AMP signal is too high, the Beolab 14 will detect this as sound and not switch off.	Hvis støjniveauet på LINE- eller AMP-signalet er højt, registrerer Beolab 14 det som lyd og slår ikke fra.	Hvis støjniveauet på LINE- eller AMP-signalet er for højt, registrerer Beolab 14 det som lyd og slår ikke fra.	"er" is written between "AMP-signalet" and "for".	Essential	1	
G	41		MT		To avoid noise on the LINE or AMP signal make sure that you have connected all sockets on Beolab 14 to the corresponding sockets on the connected product.	For at undgå støj på LINE- eller AMP-signalet skal du sikre dig, at du har tilsuttet alle stik på Beolab 14 til de tilsvarende stik på det tilsluttede produkt.	For at undgå støj på LINE- eller AMP-signalet skal du sikre dig, at du har tilsuttet alle stik på Beolab 14 til de tilsvarende stik på det tilsluttede produkt.	An additional space is deleted after "produkt."	Essential	1	
G	43		MT		MODE switch set to AMP	MODE omskifter indstillet til AMP	MODE omskifter indstillet til AMP	A hyphen is inserted between "MODE" and "omskifter".	Essential	1	
G	44		MT		MODE switch set to LINE	MODE omskifter indstillet til LINE	MODE omskifter indstillet til LINE	A hyphen is inserted between "MODE" and "omskifter".	Essential	1	
G	69		MT		No, in Beolab 14 the speakers and amplifiers are carefully adjusted to one another.	Nej, i Beolab 14 er højtaltalere og forstærkere er nøje tilpasset hinanden.	Nej, i Beolab 14 er højtaltalere og forstærkere nøje tilpasset hinanden.	"er" is deleted.	Essential	1	
H	20		72%		See the Quick guide enclosed with your Beolab 14.	Se yderligere oplysninger i den korte vejledning, der fulgte med Beolab 14.	Se den korte vejledning, der fulgte med Beolab 14.	"yderligere oplysninger i" is deleted.	Essential	1	
H	41		MT		To avoid noise on the LINE or AMP signal make sure that you have connected all sockets on Beolab 14 to the corresponding sockets on the connected product.	For at undgå støj på LINE- eller AMP-signalet skal du kontrollere, at du har tilsuttet alle stik på Beolab 14 til de tilsvarende stik på det tilsluttede produkt.	For at undgå støj på LINE- eller AMP-signalet skal du kontrollere, at du har tilsuttet alle stik på Beolab 14 til de tilsvarende stik på det tilsluttede produkt.	"kontrollere," is italicized.	Essential	1	
H	52		MT		Do not disconnect Beolab 14 from the mains during the software update.	Afbyrd ikke strømmen til Beolab 14 under softwareopdatering.	Afbyrd ikke strømmen til Beolab 14 under softwareopdateringen.	"softwareopdatering" is changed to "softwareopdateringen".	Preferential	1	
H	54		MT		A software update must always be performed by an authorised Bang & Olufsen retailer or service technician.	En softwareopdatering skal altid udføres af en autoriseret Bang & Olufsen forhandler eller servicetekniker.	En softwareopdatering skal altid udføres af en autoriseret Bang & Olufsen forhandler eller en servicetekniker.	An additional space between "eller" and "en" is deleted.	Essential	1	

Checking of the Newsletter

Translator	Segment number	Match type	Source segment	Target segment before checking	Target segment after checking	Description of change	Categorization	Number of changes
A	23	MT	Against more than 4000 competing products and projects from 54 countries, BeoPlay V1 took home the winning prize with the coveted red dot award for product design 2013.	I konkurrence med over 4000 produkter og projekter fra 54 lande vandt BeoPlay V1 vinderprisen i den eftertragtede red dot design award for bedste produkt design i 2013.	I konkurrence med over 4000 produkter og projekter fra 54 lande tog BeoPlay V1 vinderprisen i den eftertragtede red dot design award for bedste produkt design i 2013.	"vandt" is changed to "tog".	Preferential	1
C	1	MT	BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept	BeoSound 5 nu med Spotify Bang & Olufsen lancerer næste generations detailkoncept	BeoSound 5 nu med Spotify Bang & Olufsen lancerer næste generations detailkoncept	The space between "Bang" and "&" is changed to a non-breaking space.	Essential	1
C	6	76%	In line with Bang & Olufsen's dedication to continuing customer service, existing BeoSound 5 owners can easily add Spotify with a free online software update.	I overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis onlinesoftwareopdatering.	I overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis online softwareopdatering.	"onlinesoftwareopdaterin g" is changed to "online softwareopdatering".	Preferential	1
C	11	MT	Experiencing the brand's acoustic innovations first-hand has never been more accessible or compelling.	Det har aldrig været nemmere eller en større oplevelse at opleve Bang & Olufsens akustiske nyskabelser.	Det har aldrig været nemmere eller mere imponerende at opleve Bang & Olufsens akustiske nyskabelser.	"en større oplevelse" is changed to "mere imponerende".	Essential	1
C	24	MT	The all-steel industrial design is quite unique and the TV combines a lot of advanced technologies in a package that is more like a piece of furniture than consumer electronics.	Det industrielle stål design er unikt, og fjernsynet kombinerer en lang række avancerede teknologier i en samlet pakke, der ligner mere et møbel end forbrugerelektronik.	Det industrielle stål design er unikt, og fjernsynet kombinerer en lang række avancerede teknologier i en samlet pakke, der mere ligner et møbel end forbrugerelektronik.	"mere" is moved.	Essential	1
D	1 14-NL-D-1	MT	BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept	BeoSound 5 nu med Spotify Bang & Olufsen lancerer ny generation af detailkoncept	BeoSound 5 nu med Spotify Bang & Olufsen lancerer nyt butikskoncept	"ny generation af detailkoncept" is changed to "nyt butikskoncept".	Preferential	1
D	6 11-NL-D-6	76%	In line with Bang & Olufsen's dedication to continuing customer service, existing BeoSound 5 owners can easily add Spotify with a free online software update.	I overensstemmelse med Bang & Olufsens fortsatte fokus på kundeservice kan nuværende ejere af BeoSound 5 nemt tilføje Spotify via en gratis onlinesoftwareopdatering.	I overensstemmelse med Bang & Olufsens fortsatte fokus på kundeservice er det nemt for nuværende ejere af BeoSound 5 at tilføje Spotify. Det sker via en gratis onlinesoftwareopdatering.	"kan [...] nemt [...]" is changed to "er det nemt for [...] at [...]". / A full stop is inserted after "Spotify" and "Det sker" is written.	Preferential	2

D	7	74%	Spotify is available in selected markets worldwide and requires Spotify Premium.	Spotify er tilgængelig på fra og kræver Spotify Premium.	Spotify er tilgængelig på udvalgte markeder verden over og kræver Spotify Premium.	"fra" is deleted.	Essential	1
D	9	78%	Bang & Olufsen launches next-generation retail concept	Bang & Olufsen lancerer ny generation af detailkoncept	Bang & Olufsen lancerer nyt butikskoncept	"ny generation af detailkoncept" is changed to "nyt butikskoncept".	Preferential	1
D	12	MT	In an atmosphere that is luxurious but welcoming, the new design captivates curiosity as you move through the store.	I et luksuriøst, men også imødekomende miljø, pirrer det nye design nysgerrigheden på vej gennem forretningen.	I et luksuriøst, men også imødekomende miljø, pirrer det nye design nysgerrigheden på turen gennem butikken.	"vej" is changed to "turen". / "forretningen is changed to "butikken".	Preferential	2
D	13 21-NL-D-13	MT	The new retail concept will be launched in Bang & Olufsen's new flagship store in Copenhagen on 18 April.	Det nye designkoncept lanceres i Bang & Olufsen's nye flagshipsbutik i København den 18. april.	Det nye designkoncept lanceres i Bang & Olufsen's nye flagshipsbutik i København den 18. april.	The apostrophe is "Olufsen's" is deleted.	Essential	1
D	15	MT	Explore more details on the new store concept	Se flere detaljer om det nye butikskoncept.	Se nærmere på det nye butikskoncept	"flere detaljer om" is changed to "nærmere på". / The full stop is deleted.	Preferential/ Essential	1/1
D	18	90%	On display were showpieces of the latest cuts both in Italian suits and award-winning Danish speaker design – all clad in a 1200 year-old Japanese weaving technique.	Udstillingen omfattede det nyeste inden for både italienske jakkesæt og prisbelønnet dansk højttalerdesign – og det hele bindes sammen af en 1200 år gammel japansk vævetechnik.	Udstillingen omfattede det nyeste inden for både italienske jakkesæt og prisbelønnet dansk højttalerdesign – med en 1200 år gammel japansk vævetechnik som fællesnævner.	"og det hele bindes sammen af [...]" is changed to "med [...]" som fællesnævner".	Preferential	1
D	20	100%	An unswerving dedication to craftsmanship beyond the ordinary.	Et kompromisløst og exceptionelt engagement inden for håndværksmæssig kvalitet.	En kompromisløs og exceptionel tilgang til håndværksmæssig kvalitet.	"Et kompromisløst og exceptionelt engagement inden for" is changed to "En kompromisløs og exceptionel tilgang til".	Preferential	1
D	24	MT	The all-steel industrial design is quite unique and the TV combines a lot of advanced technologies in a package that is more like a piece of furniture than consumer electronics.	Det industrielle design i ren stål er ganske enkelt unikt, og fjernsynet kombinerer en lang række avancerede teknologier i en samlet pakke, der minder mere om et møbel end om forbrugerelektronik.	Det industrielle stål design er ganske enkelt unikt, og fjernsynet kombinerer en lang række avancerede teknologier i et produkt, der minder mere om et møbel end om forbrugerelektronik.	"design i ren stål" is changed to "stål design". / "en samlet pakke" is changed to "et produkt".	Preferential	2
E	15	MT	Explore more details on the new store concept	Se flere detaljer om det nye butikskoncept.	Se flere detaljer om det nye butikskoncept	The full stop is deleted.	Essential	1
G	2	77%	BeoSound 5 relaunched with Spotify integration	BeoSound 5 – relanceret med Spotify-integration	BeoSound®5 – relanceret med Spotify-integration	The space between "BeoSound" and "5" is changed to a non-breaking space.	Essential	1
G	10 4-NL-G-10	MT	Bang & Olufsen has just announced an all-new design concept for its stores.	Bang & Olufsen har for nylig annonceret et helt nyt koncept for sine butikker.	Bang & Olufsen har for nylig annonceret et helt nyt designkoncept for sine butikker.	"koncept" is changed to "designkoncept".	Essential	1

G	13	MT	The new retail concept will be launched in Bang & Olufsen's new flagship store in Copenhagen on 18 April.	Det nye forhandlerkoncept lanceres i Bang & Olufsen's nye flagskibsbutik i København den 18. april.	Det nye koncept lanceres i Bang & Olufsen's nye flagskibsbutik i København den 18. april.	"forhandlerkoncept" is changed to "koncept".	Preferential	1
G	17	97%	Bang & Olufsen showcased its iconic product design and signature sound during the Milan Furniture Fair in a unique exhibition with Italian men's fashion house Pal Zileri and Japanese textile producer HOSOO.	Bang & Olufsen præsenterede sit ikoniske produkt design og sin karakteristiske lyd møbelmessen i Milano på en enestående udstilling i modehus Pal Zileri og den japanske tekstilproducent HOSOO.	Bang & Olufsen præsenterede sit ikoniske produkt design og sin karakteristiske lyd på en enestående udstilling ved møbelmessen i Milano i samarbejde med det italienske modehus Pal Zileri og den japanske tekstilproducent HOSOO.	"møbelmessen i Milano" is moved. / "ved" is written before "møbelmessen".	Preferential/ Essential	1/1
G	18	90%	On display were showpieces of the latest cuts both in Italian suits and award-winning Danish speaker design – all clad in a 1200 year-old Japanese weaving technique.	Vi viste både det nyeste inden for italienske jakkesæt og prisbelønnet dansk højttalerdesign – og det hele blev bundet sammen af en 1200 år gammel japansk væveteknik .	Vi viste både det nyeste inden for italienske jakkesæt og prisbelønnet dansk højttalerdesign – og det hele blev bundet sammen af en 1.200 år gammel japansk væveteknik .	A full stop is inserted in "1200".	Preferential	1
G	22 17-NL-G-22	MT	B&O PLAY television wins coveted red dot award	B&O PLAY fiernsyn vinder den eftertragtede pris red dot award	B&O PLAY tv vinder den eftertragtede pris red dot award	"fiernsyn" is changed to "tv".	Preferential	1
G	24	MT	The all-steel industrial design is quite unique and the TV combines a lot of advanced technologies in a package that is more like a piece of furniture than consumer electronics.	Det unikke industrielle ståldesign og det avancerede fiernsyn kombinerer en lang række avancerede teknologier i en samlet pakke, der er mere som et møbel end forbrugerelektronik.	Det unikke industrielle ståldesign og det avancerede tv kombinerer en lang række banebrydende teknologier i en samlet pakke, der er mere som et møbel end blot forbrugerelektronik.	"fiernsyn" is changed to "tv". / "avancerede" is changed to "banebrydende". / "blot" is written before "forbrugerelektronik".	Preferential	3
H	6	76%	In line with Bang & Olufsen's dedication to continuing customer service, existing BeoSound 5 owners can easily add Spotify with a free online software update.	I overensstemmelse med Bang & Olufsen's fokus på fortsat kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis onlinesoftwareopdatering.	I overensstemmelse med Bang & Olufsen's fokus på høj kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis onlinesoftwareopdatering.	"fortsat" is changed to "høj".	Preferential	1
H	24	MT	The all-steel industrial design is quite unique and the TV combines a lot of advanced technologies in a package that is more like a piece of furniture than consumer electronics.	Det industrielle ståldesign er temmelig unikt, og fiernsynet tv kombinerer en lang række avancerede teknologier i én samlet pakke, der minder mere om et møbel end et fiernsyn .	Det industrielle ståldesign er temmelig unikt, og fiernsynet kombinerer en lang række avancerede teknologier i én samlet pakke, der minder mere om et møbel end et fiernsyn .	"tv" is deleted.	Essential	1

Appendix 9. Changes implemented during review

Review of the FAQ text

Reviewer	Translator	Segment number	Match type	Source segment	Target segment before review	Target segment after review	Description of change	Categorization	Number of changes
A	D	2	MT	When I set up BeoLab 14, should I use PL-A (PL1) or PL-B (PL-2)?	Skal jeg i opsætningen af BeoLab 14 anvende PL-A (PL1) eller PL-B (PL-2)?	Skal jeg i opsætningen af BeoLab 14 anvende PL-A (PL1) eller PL-B (PL2)?	Hyphen in "(PL-2)" is deleted.	Preferential	1
A	D	4	MT	See below table to find out which MODE setting to use:	I tabellen nedenfor kan du se, hvilken MODE indstilling du skal anvende:	I tabellen nedenfor kan du se, hvilken MODE-indstilling du skal anvende:	Hyphen inserted between "MODE" and "indstilling".	Essential	1
A	D	19	71 %	How do I adjust the sound settings on my BeoLab 14?	Hvordan ændrer jeg indstillingerne på BeoLab 14?	Hvordan ændrer jeg lydindstillingerne på BeoLab 14?	"indstillingerne" is changed to "lydindstillingerne".	Essential	1
A	D	27	100 %	Use this setting if the subwoofer is close to one surface (freestanding in a room or on a wall).	Brug denne indstilling, hvis subwooferen er placeret tæt på én overflade (fritstående på gulvet eller hængende på en væg).	Brug denne indstilling, hvis subwooferen er placeret tæt på én overflade (fritstående i et lokale eller hængende på en væg).	"på gulvet" is changed to "i et lokale".	Preferential	1
A	D	28	100 %	Shown by light grey areas in the illustration.	Dette viser de lysegrå områder i illustrationen.	De lysegrå områder i illustrationen viser dette.	"Dette viser de [...]" is changed to "De [...] viser dette".	Preferential	1
A	D	30	100 %	Use this setting if the subwoofer is placed close to two surfaces (placed on the floor close to a wall).	Brug denne indstilling, hvis subwooferen er placeret tæt på to overflader (på gulvet og tæt på en væg).	Brug denne indstilling, hvis subwooferen er placeret tæt på to overflader (på gulvet tæt på en væg).	"og" is deleted.	Preferential	1
A	D	31	100 %	Shown by medium grey areas in the illustration.	Dette viser de mellemgrå områder i illustrationen.	De mellemgrå områder i illustrationen viser dette.	"Dette viser de [...]" is changed to "De [...] viser dette".	Preferential	1
A	D	34	99 %	Shown by the dark grey areas in the illustration.	Dette er vist med de mørkegrå områder i illustrationen.	De mørkegrå områder i illustrationen viser dette.	"Dette er vist med de [...]" is changed to "De [...] viser dette".	Preferential	1
A	D	35	95 %	The positions mentioned are guidelines only.	Disse positionsindstillinger er dog kun vejledende.	Disse positionsindstillinger er kun vejledende.	"dog" is deleted.	Preferential	1
A	D	39	MT	Why does my BeoLab 14 not switch to standby after 3 minutes with no sound, when the MODE switch is set to LINE or AMP?	Hvorfor skifter min BeoLab 14 ikke til standby efter 3 minutter uden lyd, når MODE-omskifteren er indstillet til LINE eller AMP?	Hvorfor skifter min BeoLab 14 ikke til standby efter tre minutter uden lyd, når MODE-omskifteren er indstillet til LINE eller AMP?	"3" is changed to "tre".	Preferential	1

A	D	40	MT	If the noise on the LINE or AMP signal is too high, the BeoLab 14 will detect this as sound and not switch off.	Hvis støj på LINE- eller AMP-signalet er for høj, vil BeoLab 14 registrere dette som lyd og ikke slukke.	Hvis støj på LINE- eller AMP-signalet er for høj, vil BeoLab 14 registrere dette som lyd og ikke slukke.	"støj" is changed to "støjen".	Essential	1
A	D	42	MT	See below picture or the Quick guide for more information.	Se nedenstående billede eller den korte vejledning, hvis du har brug for yderligere oplysninger.	Se nedenstående billede eller den korte vejledning, hvis du har brug for yderligere oplysninger.	Additional space after the full stop is deleted.	Essential	1
A	D	46	92 %	What does the indicator light on BeoLab 14 mean?	Hvad betyder indikatorlamperne på BeoLab 14?	Hvad betyder indikatorlamperne på BeoLab 14?	"indikatorlamperne" is changed to "indikatorlampen".	Essential	1
A	D	68 2-FAQ-D-68	MT	Is the surround sound processor integrated in BeoLab 14?	Er surroundsound-processor integreret i BeoLab 14?	Er surroundsound-processor integreret i BeoLab 14?	"surroundsound-processor" is changed to "surroundsound-processoren".	Essential	1
B	E	2	MT	When I set up BeoLab 14, should I use PL-A (PL1) or PL-B (PL-2)?	Skal jeg anvende PL-A (PL1) eller PL-B (PL-2), når jeg sætter BeoLab 14 op?	Skal jeg anvende PL-A (PL1) eller PL-B (PL-2), når jeg sætter BeoLab 14 op?	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	3	MT	Which MODE setting to use depends on the type of your Bang & Olufsen television.	Det afhænger af dit Bang & Olufsen fjernsyn, hvilken MODE-indstilling du skal anvende.	Det afhænger af dit Bang & Olufsen fjernsyn, hvilken MODE-indstilling du skal anvende.	The space between "Bang" and "&" is changed to a non-breaking space.	Essential	1
B	E	12	99 %	BeoVision 7-40/55	BeoVision 7-40/55	BeoVision 7-40/55	The space between "BeoVision" and "7-40/55" is changed to a non-breaking space.	Essential	1
B	E	15	MT	Note that 'BeoLab 14' may not be available in the SPEAKER TYPE menu.	Bemærk, at 'BeoLab 14' muligvis ikke er tilgængelig i menuen SPEAKER TYPE.	Bemærk, at "BeoLab 14" muligvis ikke er tilgængelig i menuen SPEAKER TYPE.	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	19	71 %	How do I adjust the sound settings on my BeoLab 14?	Hvordan ændrer jeg lydindstillingerne på BeoLab 14?	Hvordan ændrer jeg lydindstillingerne på BeoLab 14?	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	20	72 %	See the Quick guide enclosed with your BeoLab 14.	Se den hurtigvejledning, der fulgte med BeoLab 14.	Se den hurtigvejledning, der fulgte med BeoLab 14.	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	23	MT	How should I set the bass position knob (FREE, WALL, CORNER) on BeoLab 14?	Hvordan skal jeg indstille baspositionsknappen (FREE, WALL, CORNER) på BeoLab 14?	Hvordan skal jeg indstille baspositionsknappen (FREE, WALL, CORNER) på BeoLab 14?	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	39 6-FAQ-E-39	MT	Why does my BeoLab 14 not switch to standby after 3 minutes with no	Hvorfor skifter min BeoLab 14 ikke til standby efter 3 minutter uden lyd,	Hvorfor skifter min BeoLab 14 ikke til standby efter 3 minutter uden lyd,	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1

				sound, when the MODE switch is set to LINE or AMP?			når MODE-omskifteren er indstillet til LINE eller AMP?	når MODE-omskifteren er indstillet til LINE eller AMP?	space.		
B	E	40	MT	If the noise on the LINE or AMP signal is too high, the BeoLab 14 will detect this as sound and not switch off.	15-FAQ-E-40		Hvis støjen på LINE- eller AMP-signalet er for høj, registrerer BeoLab 14 det som lyd og slukker.	Hvis støjen på LINE- eller AMP-signalet er for høj, registrerer BeoLab [®] 14 det som lyd og slukker ikke.	"ikke" is written. / The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	2
B	E	41	MT	To avoid noise on the LINE or AMP signal make sure that you have connected all sockets on BeoLab 14 to the corresponding sockets on the connected product.			For at undgå støj på LINE- eller AMP-signalet skal du sørge for, at du har tilsluttet alle stik på BeoLab 14 til de tilsvarende stik på det tilsluttede produkt.	For at undgå støj på LINE- eller AMP-signalet skal du sørge for, at du har tilsluttet alle stik på BeoLab [®] 14 til de tilsvarende stik på det tilsluttede produkt.	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	46	92 %	What does the indicator light on BeoLab 14 mean?			Hvad betyder indikatorlampen på BeoLab 14?	Hvad betyder indikatorlampen på BeoLab [®] 14?	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	52	MT	Do not disconnect BeoLab 14 from the mains during the software update.			Afbryd ikke BeoLab 14 fra lysnettet under softwareopdatering.	Afbryd ikke BeoLab [®] 14 fra lysnettet under softwareopdatering.	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	54	MT	A software update must always be performed by an authorised Bang & Olufsen retailer or service technician.			En softwareopdatering skal altid udføres af en autoriseret Bang & Olufsen forhandler eller en servicetekniker.	En softwareopdatering skal altid udføres af en autoriseret Bang & Olufsen forhandler eller en servicetekniker.	The space between "Bang" and "&" is changed to a non-breaking space.	Essential	1
B	E	61	MT	Disconnect BeoLab 14 from the mains, then reconnect it to the main again.	20-FAQ-E-61		Afbryd BeoLab 14 fra lysnettet, og tilslut den igen.	Afbryd BeoLab [®] 14 fra lysnettet, og tilslut den igen.	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	68	MT	Is the surround sound processor integrated in BeoLab 14?			Er surroundsound-processoren integreret i BeoLab 14?	Er surroundsound-processoren integreret i BeoLab [®] 14?	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	69	MT	No, in BeoLab 14 the speakers and amplifiers are carefully adjusted to one another.			Nej, i BeoLab 14 er højttalere og forstærkere nøje tilpasset hinanden.	Nej, i BeoLab [®] 14 er højttalere og forstærkere nøje tilpasset hinanden.	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
B	E	73	MT	How do I clean my BeoLab 14 and the satellites?			Hvordan rengør jeg BeoLab 14 og satellitterne?	Hvordan rengør jeg BeoLab [®] 14 og satellitterne?	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
G	C	2	MT	When I set up BeoLab 14, should I use PL-A (PL1) or PL-B (PL-2)?			Når jeg opsætter BeoLab 14, skal jeg anvende PL-A (PL1) eller PL-B (PL-2)?	Når jeg sætter BeoLab [®] 14 op, skal jeg så anvende PL-A (PL1) eller PL-B (PL-2)?	"[...] opsætter [...]" is changed to "[...] sætter [...]" op". / The space	Preferential/ Essential/ Essential	1/1/1

									between "BeoLab" and "14" is changed to a non-breaking space. / "så" is written.		
G	C	3	MT	Which MODE setting to use depends on the type of your Bang & Olufsen television.	Hvilken MODE indstilling der skal anvendes, afhænger af dit Bang & Olufsen fjernsyn.	MODE indstillingen afhænger af dit Bang & Olufsen fjernsyn.			"Hvilken MODE indstilling der skal anvendes," is changed to "MODE indstillingen". / The space between "Bang" and "&" is changed to a non-breaking space.	Preferential/ Essential	1/1
G	C	4	MT	See below table to find out which MODE setting to use:	Se tabellen nedenfor for at finde ud af, hvilken MODE indstilling der skal anvendes:	Tabellen nedenfor viser, hvilken MODE indstilling du skal bruge:			"Se [...] for at finde ud af" is changed to "[...] viser". / "der skal anvendes" is changed to "du skal bruge".	Preferential	2
G	C	9	MT	TVs with RJ45 Power Link sockets:	Fjernsyn med RJ45 Power Link stik:	Fjernsyn med Power ^a Link RJ45-stik:			"RJ45" is moved from before to after "Power Link". / Hyphen is inserted between "RJ45" and "stik". / The space between "Power" and "Link" is changed to a non-breaking space.	Preferential/ Essential/ Essential	1/1/1
G	C	14	MT	TVs with Din Power Link sockets:	Fjernsyn med DIN Power Link stik:	Fjernsyn med Power ^a Link DIN stik:			"DIN" is moved from before to after "Power Link". / The space between "Power" and "Link" is changed to a non-breaking space.	Preferential/ Essential	1/1
G	C	15	MT	Note that 'BeoLab 14' may not be available in the SPEAKER TYPE menu.	Bemærk, at 'BeoLab 14' ikke er tilgængelig i SPEAKER TYPE menuen.	Bemærk, at "BeoLab" ¹⁴ muligvis ikke er tilgængelig i menuen SPEAKER TYPE.			The space between "BeoLab" and "14" is changed to a non-breaking space. / The single inverted commas around "BeoLab" are changed to double inverted commas. / "menuen" is moved.	Essential/ Preferential/ Preferential	1/1/1
G	C	19	71 %	How do I adjust the sound settings on my BeoLab 14?	Hvordan ændrer jeg lydindstillingerne på BeoLab 14?	Hvordan ændrer jeg lydindstillingerne på BeoLab ¹⁴ ?			The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
G	C	20	72 %	See the Quick guide enclosed with your BeoLab 14.	Se yderligere oplysninger i den korte vejledning, der fulgte med BeoLab 14.	Se yderligere oplysninger i den korte vejledning, der fulgte med BeoLab ¹⁴ .			The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
G	C	23	MT	How should I set the bass position knob (FREE,	Hvordan skal jeg indstille baspositionsskifteren	Hvordan skal jeg indstille basdrejeknappen (FREE,			"baspositionsskifteren" is changed to	Preferential/ Essential	1/1

				WALL, CORNER) on BeoLab 14?		(FREE, WALL, CORNER) på BeoLab 14?	WALL, CORNER) på BeoLab ¹⁴ ?	"basdrejeknappen". / The space between "BeoLab" and "14" is changed to a non-breaking space.			
G	C	24	79 %	The setting of the bass position knob is based on the number of surfaces the subwoofer is in close proximity of.	Indstillingen af baspositionsskifteren afhænger af det antal overflader, som subwooferen står i nærheden af.	Basdrejeknappen indstilling afhænger af det antal overflader, som subwooferen står i nærheden af.	Basdrejeknappen indstilling afhænger af det antal overflader, som subwooferen står i nærheden af.	"Indstillingen af [...] is changed to "[...] indstilling". / "baspositionsskifteren" is changed to "basdrejeknappen".	Preferential	2	
G	C	25	98 %	Use the position knob to filter out the natural bass change obtained if the subwoofer is placed, for example, in a corner, as compared to a more freestanding position.	Brug positionsskifteren til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.	Brug drejeknappen til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.	Brug drejeknappen til at bortfiltrere ændringer i basgengivelsen som følge af, at subwooferen f.eks. er placeret i et hjørne i stedet for frit.	"positionsskifteren" is changed to "drejeknappen".	Preferential	1	
G	C	27	100 %	Use this setting if the subwoofer is close to one surface (freestanding in a room or on a wall).	Brug denne indstilling, hvis subwooferen er placeret tæt på én overflade: fritstående (gulvet) eller hængende på en væg.	Brug denne indstilling, hvis subwooferen er placeret tæt på én overflade: fritstående (gulvet) eller hængende på en væg.	Brug denne indstilling, hvis subwooferen er placeret tæt på én overflade: fritstående på gulvet eller hængende på en væg.	The parentheses around "gulvet" are deleted and "på" is written.	Preferential	1	
G	C	28	100 %	Shown by light grey areas in the illustration.	Det er vist med de lysegrå områder i illustrationen ovenfor.	Det er vist med de lysegrå områder i illustrationen ovenfor.	Dette er vist med de lysegrå områder i illustrationen ovenfor.	"Det" is changed to "Dette".	Preferential	1	
G	C	31	100 %	Shown by medium grey areas in the illustration.	Dette viser de mellemgrå områder i illustrationen ovenfor.	Dette viser de mellemgrå områder i illustrationen ovenfor.	Dette er vist med de mellemgrå områder i illustrationen ovenfor.	"Dette viser" is changed to "Dette er vist med".	Preferential	1	
G	C	34	99 %	Shown by the dark grey areas in the illustration.	Det er vist med de mørkegrå områder i illustrationen ovenfor.	Det er vist med de mørkegrå områder i illustrationen ovenfor.	Dette er vist med de mørkegrå områder i illustrationen ovenfor.	"Det" is changed to "Dette".	Preferential	1	
G	C	36	75 %	You may set the position knob to any position depending on your sound preference.	Du kan frit indstille positionsskifteren, som du foretrækker.	Du kan frit indstille positionsskifteren, som du foretrækker.	Du kan frit indstille drejeknappen, som du foretrækker.	"positionsskifteren" is changed to "drejeknappen"	Preferential	1	
G	C	37	MT	For more details, see the [tag] Technical Sound Guide [tag].	Se yderligere oplysninger i [tag] Technical Sound Guide [tag].	Se yderligere oplysninger i [tag] Technical Sound Guide [tag].	Se yderligere oplysninger i [tag] Technical Sound Guide [tag].	Change(s) in space(s) around tag(s).	Essential	1	
G	C	39	MT	Why does my BeoLab 14 not switch to standby after 3 minutes with no sound, when the MODE switch is set to LINE or AMP?	Hvorfor skifter min BeoLab 14 ikke til standby efter 3 minutter uden lyd, når MODE omskifteren er indstillet til LINE eller AMP?	Hvorfor skifter min BeoLab 14 ikke til standby efter 3 minutter uden lyd, når MODE omskifteren er indstillet til LINE eller AMP?	Hvorfor skifter BeoLab ¹⁴ ikke til standby efter 3 minutter uden lyd, når MODE omskifteren er indstillet til LINE eller AMP?	"min" is deleted. / The space between "BeoLab" and "14" is changed to a non-breaking space. / The space between "3" and "minutter" is changed to a non-breaking space.	Essential/ Essential/ Preferential	1/1/1	
G	C	40	MT	If the noise on the LINE or	Hvis lyden på LINE eller	Hvis lyden på LINE eller	Hvis støjriveauet på LINE-	"lyden" is changed to	Essential	3	

					AMP signal is too high, the BeoLab 14 will detect this as sound and not switch off.			AMP signalet er for højt, registrerer BeoLab 14 det som lyd og slukkes ikke.	eller AMP-signalet er for højt, registrerer BeoLab 14 det som lyd og slukkes ikke.	"støjniveauet" and "høj" is changed to "højt". / Hyphen inserted after "LINE" and between "AMP" and "signalet". / The space between "BeoLab" and "14" is changed to a non-breaking space.		
G	C	41	MT		To avoid noise on the LINE or AMP signal make sure that you have connected all sockets on BeoLab 14 to the corresponding sockets on the connected product.		For at undgå støj på LINE eller AMP signalet skal du sørge for, at du har tilsluttet alle stik på BeoLab 14 til de tilsvarende stik på det tilsluttede produkt.	For at undgå støj på LINE- eller AMP-signalet skal du kontrollere, at alle stik på BeoLab 14 er forbundet med de tilsvarende stik på det tilsluttede produkt.	Hyphen inserted after "LINE" and between "AMP" and "signalet". / "sørge for" is changed to "kontrollere". / "du har tilsluttet [...]" is changed to "er forbundet med". / The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential/ Preferential/ Preferential/ Essential	1/1/1/1	
G	C	43	MT		MODE switch set to AMP		MODE omskifter indstillet til AMP	MODE omskifter indstillet til AMP	Hyphen is inserted between "MODE" and "omskifter".	Essential	1	
G	C	44	MT		MODE switch set to LINE		MODE omskifter indstillet til LINE	MODE-omskifter indstillet til LINE	Hyphen is inserted between "MODE" and "omskifter".	Essential	1	
G	C	46	92 %		What does the indicator light on BeoLab 14 mean?		Hvad betyder indikatorlampen på BeoLab 14?	Hvad betyder indikatorlampen på BeoLab 14?	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1	
G	C	52	MT		Do not disconnect BeoLab 14 from the mains during the software update.		Afbryd ikke strømmen til BeoLab 14 under softwareopdateringen.	Afbryd ikke strømmen til BeoLab 14 under softwareopdateringen.	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1	
G	C	54	MT		A software update must always be performed by an authorised Bang & Olufsen retailer or service technician.		En softwareopdatering skal altid udføres af en autoriseret Bang & Olufsen forhandler eller servicetekniker.	En softwareopdatering skal altid udføres af en autoriseret Bang& Olufsen forhandler eller servicetekniker.	The space between "Bang" and "&" is changed to a non-breaking space.	Essential	1	
G	C	55	MT		Switched on (10 seconds duration)		Tændt (10 sekunders varighed)	Tændt i 10 sek.	"(10 sekunders varighed)" is changed to "i 10 sek."	Preferential	1	
G	C	57	100 %		n/a*		Ikke relevant*	I/R*	"Ikke relevant" is changed to "I/R".	Preferential	1	
G	C	58	MT		Switched off (10 seconds duration)		Slukket (10 sekunders varighed)	Slukket i 10 sek.	"(10 sekunders varighed)" is changed to "i 10 sek."	Preferential	1	
G	C	61	MT		Disconnect BeoLab 14		Afbryd strømmen til	Afbryd strømmen til	The space between	Essential/	1/1	

G	C	64	MT	from the mains, then reconnect it to the main again.	BeoLab 14, og tilslut den derefter igen.	BeoLab [®] 14, og tilslut den igen.	"BeoLab" and "14" is changed to a non-breaking space. / "derefter" is deleted.	Preferential	
G	C	64	MT	Reduce the volume level and wait some time until the product returns to normal.	Reducér lydstyrken, og vent et stykke tid, indtil produktet vender tilbage til normal tilstand.	Skr ned for lydstyrken, og vent, indtil produktet vender tilbage til normal tilstand.	"Reducér" is changed to "Skr ned for". / "et stykke tid" is deleted.	Preferential	2
G	C	68	MT	Is the surround sound processor integrated in BeoLab 14?	Er surround sound-processoren integreret i BeoLab 14 ?	Er surround sound-processoren integreret i BeoLab [®] 14 ?	The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	1
G	C	73	MT	How do I clean my BeoLab 14 and the satellites?	Hvordan rengør jeg mit BeoLab 14 og satellitterne?	Hvordan rengør jeg BeoLab [®] 14 og satellitterne?	"mit" is deleted. / The space between "BeoLab" and "14" is changed to a non-breaking space.	Essential	2
H	F	5	MT	PL- A (PL1)	PL- A (PL1)	PL-A (PL1)	The space between "PL-" and "A" is deleted.	Preferential	1
H	F	9	MT	TVs with RJ45 Power Link sockets:	Fjernsyn med RJ45-Power Link-stik:	Fjernsyn med RJ45 Power Link-stik:	Hyphen between "RJ45" and "Power" is deleted. / "-stik" is changed from red to black formatting.	Essential	2
H	F	14	MT	TVs with Din Power Link sockets:	Fjernsyn med DIN Power Link-stik:	Fjernsyn med DIN Power Link-stik:	"-stik" is changed from red to black formatting.	Essential	1
H	F	16	91 %	See the Quick guide for more information.	Se yderligere oplysninger i den korte vejledning, der fulgte med BeoLab 14.	Se oplysninger i den korte vejledning, der fulgte med BeoLab 14.	"yderligere" is deleted.	Preferential	1
H	F	25	98 %	Use the position knob to filter out the natural bass change obtained if the subwoofer is placed, for example, in a corner, as compared to a more freestanding position.	Brug indstillingsknappen til at bortfiltrere ændringer i basgengivelsen, som skyldes, at subwooferen f.eks. er placeret i et hjørne i stedet for fritstående.	Brug indstillingsknappen til at bortfiltrere ændringer i basgengivelsen, som skyldes, at subwooferen f.eks. er placeret i et hjørne i stedet for i en mere fritstående position.	"i en mere" and "position" is written.	Essential	1
H	F	34	99 %	Shown by the dark grey areas in the illustration.	Det er vist med de mørkegrå områder i nedenstående illustration.	Dette er vist med de mørkegrå områder i nedenstående illustration.	"Det" is changed to "Dette".	Preferential	1
H	F	36	75 %	You may set the position knob to any position depending on your sound preference.	du kan frit indstille omskifteren, som du vil.	du kan frit indstille knappen, som du vil.	"omskifteren" is changed to "knappen".	Essential	1
H	F	39	MT	Why does my BeoLab 14 not switch to standby after 3 minutes with no sound, when the MODE switch is set to LINE or	Hvorfor skifter BeoLab 14 ikke til standby efter 3 minutter uden lyd, når MODE-omskifteren er indstillet til LINE eller	Hvorfor skifter BeoLab 14 ikke til standby efter 3 minutter uden lyd, når MODE-omskifteren er indstillet til LINE eller	"MODE" is changed from black to red formatting. / "eller" is changed from red to black formatting.	Essential	2

H	F	40		AMP? If the noise on the LINE or AMP signal is too high, the BeoLab 14 will detect this as sound and not switch off.	AMP? Hvis støjen på LINE - eller AMP -signalet er for høj, registrerer BeoLab 14 dette som lyd og går derfor ikke på standby.	AMP? Hvis støjen på LINE - eller AMP -signalet er for høj, registrerer BeoLab 14 dette som lyd og går derfor ikke på standby.	AMP? Hvis støjen på LINE - eller AMP -signalet er for høj, registrerer BeoLab 14 dette som lyd og går derfor ikke på standby.	"AMP" is changed from black to red formatting.	Essential	1
H	F	41		To avoid noise on the LINE or AMP signal make sure that you have connected all sockets on BeoLab 14 to the corresponding sockets on the connected product.	For at undgå støj på LINE - eller AMP -signalet skal du kontrollere, at du har sluttet alle stik på BeoLab 14 til de tilsvarende stik på det tilsluttede produkt.	For at undgå støj på LINE - eller AMP -signalet skal du kontrollere, at du har sluttet alle stik på BeoLab 14 til de tilsvarende stik på det tilsluttede produkt.	For at undgå støj på LINE - eller AMP -signalet skal du kontrollere, at du har sluttet alle stik på BeoLab 14 til de tilsvarende stik på det tilsluttede produkt.	"eller" is changed from red to black formatting.	Essential	1
H	F	42		See below picture or the Quick guide for more information.	Se nedenstående illustration eller den korte Vejledning for at få yderligere oplysninger.	Se nedenstående illustration eller den korte Vejledning for at få yderligere oplysninger.	Se nedenstående illustration eller den korte Vejledning for at få yderligere oplysninger.	"V" in "Vejledning" is changed to a small "v".	Essential	1
H	F	46		What does the indicator light on BeoLab 14 mean?	Hvad betyder indikatorlamperne på BeoLab 14?	Hvad betyder indikatorlamperne på BeoLab 14?	Hvad betyder indikatorlamperne på BeoLab 14?	"Beolit" is changed to "BeoLab".	Essential	1
H	F	52		Do not disconnect BeoLab 14 from the mains during the software update.	Strømkvikket fra BeoLab 14 må ikke tages ud af stikkontakten under softwareopdateringen.	Strømkvikket fra BeoLab 14 må ikke tages ud af stikkontakten under softwareopdateringen.	Strømkvikket fra BeoLab 14 må ikke tages ud af stikkontakten under softwareopdateringen.	Change(s) in space(s) around tag(s).	Essential	1
H	F	66		Placement of the indicator light.	Indikatorlampe	Indikatorlampe	Indikatorlampens placering	"Indikatorlampe" is changed to "Indikatorlampens placering".	Preferential	1
H	F	71		For more information, see the Technical Sound Guide.	Du finder flere oplysninger i Technical Sound Guide.	Du finder flere oplysninger i Technical Sound Guide.	Du finder flere oplysninger i Technical Sound Guide.	"i" is written.	Essential	1

Review of the Newsletter

Reviewer	Translator	Segment number	Match type	Source segment	Target segment before review	Target segment after review	Description of change	Categorization	Number of changes
C	G	5	MT	BeoSound 5's already versatile repertoire.	det allerede alsidige repertoire for BeoSound 5.	BeoSound 5's allerede alsidige repertoire.	"det [...] for BeoSound 5" is changed to "BeoSound 5's [...]".	Preferential	1
C	G	6	76 %	In line with Bang & Olufsen's dedication to continuing customer service, existing BeoSound 5 owners can easily add Spotify with a free online software update.	I overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis online onlinesoftwareopdatering.	I overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify via en gratis online softwareopdatering.	"onlinesoftwareopdaterin g" is changed to "online softwareopdatering".	Preferential	1
C	G	7	74 %	Spotify is available in selected markets worldwide and requires Spotify Premium.	Spotify på BeoSound 5 er tilgængelig på udvalgte markeder verden over og kræver et Spotify Premium-abonnement.	Spotify på BeoSound 5 er tilgængelig på udvalgte markeder verden over og kræver et Spotify Premium-abonnement.	Hyphen is inserted between "Premium" and "abonnement".	Essential	1
C	G	13	MT	The new retail concept will be launched in Bang & Olufsen's new flagship store in Copenhagen on 18 April.	Det nye koncept lanceres i Bang & Olufsen's nye flagskibsbutik i København den 18. april.	Det nye koncept lanceres i Bang & Olufsens nye flagskibsbutik i København den 18. april.	Apostrophe in "Olufsen's" is deleted.	Essential	1
D	A	1	MT	BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept with Spotify integration	BeoSound 5 nu med Spotify Bang & Olufsen lancerer næste generations detailkoncept med Spotify-integration	BeoSound 5 nu med Spotify Bang & Olufsen lancerer nyt butikskoncept	"næste generations detailkoncept" is changed to "nyt butikskoncept".	Preferential	1
D	A	2	77 %	BeoSound 5 relaunched with Spotify integration	BeoSound 5 – relanceret med Spotify-integration	BeoSound 5 relanceres med Spotify-integration	Dash is deleted. / "Relanceret" is changed to "relanceres".	Preferential	2
D	A	4	84 %	Bang & Olufsen's digital music system, BeoSound 5, now ships with complete Spotify integration, adding 20 million songs in premium sound quality to	Bang & Olufsens digitale musiksistem, BeoSound 5, leveres nu med komplet Spotify-integration og tilbyder dermed 20 millioner sange i førsteklases lydkvalitet.	Bang & Olufsens digitale musiksistem, BeoSound 5, leveres nu med komplet Spotify-integration og følger dermed 20 millioner sange i førsteklases lydkvalitet til	"tilbyder [...]" is changed to "følger [...]" til".	Essential	1
D	A	6	76 %	In line with Bang & Olufsen's dedication to continuing customer service, existing BeoSound 5 owners can easily add	I overensstemmelse med Bang & Olufsens fokus på fortsat kundeservice kan eksisterende BeoSound 5 ejere nemt tilføje Spotify	I overensstemmelse med Bang & Olufsens fortsatte fokus på kundeservice kan nuværende ejere af BeoSound 5 nemt tilføje	"fokus på fortsat kundeservice" is changed to "fortsatte fokus på kundeservice". / "eksisterende" is changed	Preferential	3

				Spotify with a free online software update.	via en gratis onlinesoftwareopdatering.	Spotify via en gratis onlinesoftwareopdatering.	to "nuværende". / "BeoSound 5 ejere" is changed to "ejere af BeoSound 5".		
D	A	7	74 %	Spotify is available in selected markets worldwide and requires Spotify Premium.	Spotify på BeoSound 5 er tilgængelig på udvalgte markeder verden over og kræver Spotify Premium.	Spotify er tilgængelig på udvalgte markeder verden over og kræver Spotify Premium.	"på BeoSound 5" is deleted.	Preferential	1
D	A	9	78 %	Bang & Olufsen launches next-generation retail concept	Bang & Olufsen lancerer næste generations detailkoncept	Bang & Olufsen lancerer nyt butikskoncept	"næste generations detailkoncept" is changed to "nyt butikskoncept".	Preferential	1
D	A	10	MT	Bang & Olufsen has just announced an all-new design concept for its stores.	Bang & Olufsen offentliggjorde for nylig et helt nyt designkoncept til sine butikker.	Bang & Olufsen har netop offentliggjort et helt nyt designkoncept til sine butikker.	"for nylig" is changed to "netop". / "offentliggjorde" is changed to "offentliggjort".	Preferential	2
D	A	11	MT	Experiencing the brand's acoustic innovations first-hand has never been more accessible or compelling.	Det har aldrig været nemmere eller mere fængslende at få en førstehåndsoplevelse af mærkets akustiske nyskabelser.	Det har aldrig været nemmere eller mere fængslende at få en førstehåndsoplevelse af brandets akustiske nyskabelser.	"mærkets" is changed to "brandets".	Preferential	1
D	A	12	MT	In an atmosphere that is luxurious but welcoming, the new design captivates curiosity as you move through the store.	I luksuriøse, men imødekommande omgivelser tiltrækker det nye design opmærksomheden, mens man bevæger sig rundt i butikken.	I luksuriøse, men også imødekommande omgivelser pirrer det nye design nysgerrigheden på vejen rundt i butikken.	"også" is written. / "tiltrækker" is changed to "pirrer". / "opmærksomheden" is changed to "nysgerrigheden". / "mens man bevæger sig" is changed to "på vejen" skrives.	Preferential	4
D	A	13	MT	The new retail concept will be launched in Bang & Olufsen's new flagship store in Copenhagen on 18 April.	Det nye designkoncept lanceres i Bang & Olufsen's nye flagsskib i København den 18. april.	Det nye designkoncept lanceres i Bang & Olufsen's nye flagsskibsbutik i København den 18. april.	Apostrophe in "Olufsen's" is deleted. / "flagsskib" is changed to "flagsskibsbutik".	Essential	2
D	A	14	MT	Other Bang & Olufsen stores in major cities worldwide will be updated beginning later in 2013.	Andre Bang & Olufsen butikker i større byer verden over vil blive opdateret med start senere i 2013.	Andre Bang & Olufsen-butikker i større byer verden over vil blive opdateret med start senere i 2013.	Hyphen is inserted between "Olufsen" and "butikker".	Essential	1
D	A	18	90 %	On display were showpieces of the latest cuts both in Italian suits and award-winning Danish speaker design – all clad in a 1200 year-old Japanese weaving technique.	Det nyeste inden for italienske jakkesæt og prisbelønnet dansk højttalerdesign blev vist – det hele bundet sammen af en 1200 år gammel japansk væveteknik som den røde	Det nyeste inden for italienske jakkesæt og prisbelønnet dansk højttalerdesign blev vist – med en 1200 år gammel japansk væveteknik som den røde	"det hele bundet sammen af" is changed to "med [...] som den røde tråd".	Preferential	1

D	A		20	100 %	An unsuerving dedication to craftsmanship beyond the ordinary.	væveteknik. Et kompromisløst og exceptionelt engagement inden for håndværksmæssig kvalitet.	tråd. En kompromisløs og exceptionel tilgang til håndværksmæssig kvalitet.	"Et kompromisløst og exceptionelt engagement inden for" is changed to "En kompromisløs og exceptionel tilgang til".	Preferential	1
D	A		21	MT	Read more about craftsmanship beyond the ordinary	Læs mere om håndværk ud over det sædvanlige	Læs mere om håndværk ud over det sædvanlige	"om" is written. / "den højeste håndværksmæssige kvalitet" is changed to "håndværk ud over det sædvanlige".	Essential/ Preferential	1/1
D	A		22	MT	B&O PLAY television wins coveted red dot award	B&O PLAY fjernsynet vinder den eftertragtede red dot design award	B&O PLAY vinder den eftertragtede red dot design award	"fjernsynet" is deleted.	Preferential	1
D	A		23	MT	Against more than 4000 competing products and projects from 54 countries, BeoPlay V1 took home the winning prize with the coveted red dot award for product design 2013.	I konkurrence med over 4000 produkter og projekter fra 54 lande tog BeoPlay V1 vinderprisen i den eftertragtede red dot design award for bedste produkt design i 2013.	I konkurrence med over 4000 produkter og projekter fra 54 lande vandt BeoPlay V1 den eftertragtede red dot design award for bedste produkt design i 2013.	"tog [...] vinderprisen i" is changed to "vandt [...]".	Preferential	1
D	A		24	MT	The all-steel industrial design is quite unique and the TV combines a lot of advanced technologies in a package that is more like a piece of furniture than consumer electronics.	Det industrielle stål design er unikt, og fjernsynet kombinerer en lang række avancerede teknologier i en samlet pakke, der er mere ligner et møbel end forbrugerelektronik.	Det industrielle stål design er unikt, og fjernsynet kombinerer en lang række avancerede teknologier i en samlet pakke, der mere ligner et møbel end forbrugerelektronik.	"er" is deleted.	Essential	1
E	B		1	MT	BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept	BeoSound 5 nu med Spotify integreret Bang & Olufsen lancerer næste generations butikskoncept	BeoSound 5 – nu med Spotify integreret Bang & Olufsen lancerer næste generations butikskoncept	A dash is inserted between "5" and "nu".	Preferential	1
E	B		18	90 %	On display were showpieces of the latest cuts both in Italian suits and award-winning Danish speaker design – all clad in a 1200 year-old Japanese weaving technique.	Vi viste både det nyeste inden for italienske jakkesæt og prisbelønnet dansk højttaler design – og det hele var bundet sammen af en 1.200 år gammel japansk væveteknik.	Vi viste både det nyeste inden for italienske jakkesæt og prisbelønnet dansk højttaler design – og det hele var bundet sammen af en 1.200 år gammel japansk væveteknik.	A full stop is inserted in "1200".	Preferential	1
F	H		1	MT	BeoSound 5 now has Spotify inside Bang & Olufsen launches next generation retail concept	BeoSound 5 - nu med Spotify Bang & Olufsen lancerer næste generation af sit butikskoncept	BeoSound ⁵ - nu med Spotify Bang [®] & Olufsen lancerer næste generation af sit butikskoncept	The spaces between "BeoSound" and "5" is changed to a non-breaking space. / The space	Essential	2

							between "Bang" and "&" is changed to a non-breaking space.			
F	H	4	84 %		Bang & Olufsen's digital music system, BeoSound 5, now ships with complete Spotify integration, adding 20 million songs in premium sound quality to	Bang & Olufsens digitale musiksystem, BeoSound 5, leveres nu med komplet Spotify-integration, og følger dermed 20 millioner sange i førsteklases lydkvalitet til	Bang & Olufsens digitale musiksystem, BeoSound 5, leveres nu med komplet Spotify-integration og følger dermed 20 millioner sange i førsteklases lydkvalitet til	Comma after "Spotify-integration" is deleted.	Essential	1
F	H	11	MT		Experiencing the brand's acoustic innovations first-hand has never been more accessible or compelling.	Derfor er det nu blevet endnu lettere for kunderne at opleve Bang & Olufsens akustiske nyskabelser.	Derfor er det nu blevet endnu lettere for kunderne at opleve Bang & Olufsens akustiske nyskabelser.	The space between "Bang" and "&" is changed to a non-breaking space.	Essential	1
F	H	13	MT		The new retail concept will be launched in Bang & Olufsen's new flagship store in Copenhagen on 18 April.	Det nye butikskoncept lanceres i Bang & Olufsens nye flagskibsbutik i København den 18. april, 18 April.	Det nye butikskoncept lanceres i Bang & Olufsens nye flagskibsbutik i København den 18. april,	The space between "Bang" and "&" is changed to a non-breaking space.	Essential	1
F	H	22	MT		B&O PLAY television wins coveted red dot award	B&O PLAY fjernsyn vinder den eftertragtede red dot award	B&O [®] PLAY fjernsyn vinder den eftertragtede red dot award	The space between "B&O" and "PLAY" is changed to a non-breaking space.	Essential	1
F	H	23	MT		Against more than 4000 competing products and projects from 54 countries, BeoPlay V1 took home the winning prize with the coveted red dot award for product design 2013.	I konkurrence med over 4.000 produkter og projekter fra 54 lande vandt BeoPlay V1 den eftertragtede red dot award for bedste produkt design i 2013.	I konkurrence med over 4.000 produkter og projekter fra 54 lande vandt BeoPlay [®] V1 den eftertragtede red dot award for bedste produkt design i 2013.	The space between "BeoPlay" and "V1" is changed to a non-breaking space.	Essential	1
F	H	25	MT		Enjoy more of BeoPlay V1	Læs mere om BeoPlay V1	Læs mere om BeoPlay [®] V1	The space between "BeoPlay" and "V1" is changed to a non-breaking space.	Essential	1