

Social Groups in Machine Translation Post-Editing: A SCOT Analysis

Akiko Sakamoto* and Masaru Yamada**

*University of Portsmouth, United Kingdom

**Kansai University, Japan

Abstract

We analysed focus group interview data collected from 22 project managers (PMs) working in Japan, covering their experiences of machine translation post-editing (MTPE). A Social Construction of Technology analysis of how PMs describe different social groups in translation enabled us to examine the meanings those groups attach to MTPE, the intricate and complex power structures which exist between them, and the negotiations that take place in their day-to-day operations. The examination discovered that MTPE is still in a fluid and controversial state due to the difficulty of meeting all groups' interests, which may lead to MTPE's disappearance as a business model and the eventual dominance of conventional human translation and raw MT. We conclude that establishing ethical and sustainable translation workflows for all social groups will be vital for MTPE's survival, which will require careful consideration of the complexity of these social groups and negotiations between them.

Keywords

SCOT (Social Construction of Technology), machine translation (MT), machine translation post-editing (MTPE), translation project managers, translation industry, sociology of translation

1. Introduction

A large body of machine translation (MT) research examines the quality of MT outputs and the efficiency of the machine translation post-editing (MTPE) process compared to human translation (e.g. Daems et al. 2017; Garcia 2011; O'Brien 2011). By focusing on productivity gains, such research may encourage a pro-innovation view amongst industry stakeholders that good quality MT will naturally make translation workflows more efficient, and thus cost-effective, irrespective of social

consequences. In addition, much of the discourse produced in the translation industry reflects deterministic views on translation technologies, which puts the onus on the language service sector to adjust to rapid technological advances in order to take advantage of their benefits (Olohan 2017, 267). For example, in talks about the recent development of AI (Artificial Intelligence), we find statements such as “[c]ompanies will need to move quickly, adopting Linguistic AI... to make [digital globalisation strategies] a reality” (Davies 2019) or “it’s more vital than ever for businesses to adapt to the AI and tech revolution.” (Eakins 2019)

In this environment, the sociological aspects of MT as an innovation are worth investigating, as limited understanding of system adoption purely as technical change, rather than as socio-technical change, often leads to system failure (Olohan 2011, 345), which then threatens the sustainability of the new technology-driven practice (i.e., MTPE). Our epistemological approach here is influenced by the belief that technological artefacts and their associated practices are political (Winner 1999). In his seminal article, Winner claims that no technological artefacts are inherently neutral and that the design of technology reflects the developer’s political view, which shapes the social and economic consequences. Winner’s hallmark example is the Robert Moses’ bridges in the Long Island, New York, where the underpasses were designed so low that buses could not traverse them, restricting the use of the highways under the bridges to automobile owners. As a result, low-income residents could not travel to Long Island beach resorts, which made the resorts exclusive to more affluent, white residents (Winner 1999, 30–31).

The notion of racial and economic discrimination may at first seem far-fetched in a discussion of translation technologies. However, considering that marginalisation and disempowerment of translators in translation production processes are growing concerns in the translation industry, evidenced by a growing body of translation technologies research (e.g. Garcia 2007; Kenny 2011; Moorkens 2017; Moorkens et al. 2016), we believe Winner’s theoretical framework is productive and necessary. Although some industry stakeholders claim that MTPE is “fast becoming a standard practice in our industry,” (Massardo et al. 2016, 5), this does not mean all actors in the industry agree on the best practice of MTPE. Many translators are reluctant to take on MTPE work due to social factors such as payment, experience, employment environment and types of work (Cadwell, O’Brien, and Teixeira 2018; Guerberof Arenas 2013; Moorkens et al. 2018; Sakamoto 2019). This indicates that different

actor groups in the industry hold different attitudes and perspectives about best practice of MT adoption and the MT workflow.

In studies of actor groups in translation, the traditional framework provided by the functionalist school of translation (Holz-Mänttari 1984; Reiss and Vermeer 2013) has been influential. A few decades on, Abdallah and Koskinen (2007, 674) point out that this traditional ‘expertise-based’ dyadic framework (i.e., translators with expertise vs. clients) has a limitation in understanding the modern, complex network-style production system. In the context of more recent production systems involving MTPE, Vieira and Alonso (2019) identified two social groups: the management group and the production group. By examining discourses produced by the two groups, they concluded that adoption of MT in a human translation workflow disrupts many aspects of the conventional production system, particularly by restricting translators’ influence on text production and marginalising them from business strategies. Our study scrutinises this dichotomous power structure further by identifying sub-groups within those two larger groups. We believe that only by engaging with the attitudes and perspectives of different sub-groups in relation to MT can we truly understand the complex human factors underlining the real challenges the industry is facing in realising sustainable and ethical MT workflows.

To this end, the data collected in a focus group study with 22 translation project managers (PMs) working in Japan is analysed. The next section explains the method of the data collection and analysis. Section 3 presents the results of the analysis, describing what social sub-groups were identified and what meanings each group attaches to MTPE. Section 4 examines how the sub-groups try to come to a closure in negotiating the different meanings. Section 5 discusses the significance of the outcomes for the purpose of achieving fair and ethical MT workflows and recommends how the research outcomes can be used for that purpose.

2. The Study

Methodology

This study uses the framework of Social Construction of Technology (SCOT), which was developed by Pinch and Bijker (1984) in Science and Technology Studies. Broadly speaking there are two epistemological stances in understanding the complex relation between technologies and humans. One is Technological Determinism (TD),

which sees technologies as the source of changes in human behaviours and eventually in society. The other is SCOT, which, as opposed to TD, posits that humans shape technological artefacts, and practices using these artefacts (Giotta 2018, 136–137). Three key concepts in SCOT are ‘relevant social groups’, ‘interpretive flexibility’ and ‘closure and stabilisation’ (Kline and Pinch 1996). ‘Relevant social groups’ consist of people who develop or use the artefact. In a group, the members of the group share the meaning of the artefact. Different social groups attach different meanings to the artefact, which indicates the ‘interpretive flexibility’ of the artefact. When a new artefact is developed and brought into society, it is normal that different understandings emerge across various social groups, with no one understanding being dominant. Interpretive flexibility, however, does not last forever; ‘closure’ and ‘stabilization’ occur when the artefact presents fewer problems and becomes increasingly the dominant form of the technology (Kline and Pinch 1996, 766). When a closure is achieved, the problem is perceived to be solved and relevant social groups enjoy a stable use of the technology.

One famous example of SCOT analysis is Kline and Pinch’s (1996) study of automobiles in rural American society in the early 20th century. In this setting automobiles as a new artefact came to a closure after a period of resistance from farm workers. Similarly, in translation, it would be reasonable to understand that translation memory (TM) is an artefact which, after a period of resistance from translators, has come to a closure. Different industry stakeholders as well as educators now consider TM to be a must-have tool for translators even though some quality-related issues with the TM technology have not been resolved (e.g. Dragsted 2006; Bowker 2006). Olohan (2017) advocates the SCOT approach in order to understand how and why some people in the translation community are committed to deterministic ideas and how these views continue to hold sway. This approach is, however, not easy to achieve because working with the concepts of social groups and dominant technological frames is difficult and the researcher may misidentify them (Olohan 2017, 274). To overcome this difficulty, we chose translation PMs as research targets. They are suitable informers because they are in contact with different social groups in their day-to-day operations (including their employers’ management teams, translators, post-editors, clients, tool vendors, etc.). As such, their views are informed by their interactions with and observations of other social actors, offering a valuable instrument for the SCOT analysis.

Data Collection

Four focus groups were conducted in Japan (three in Tokyo and one in Osaka) in July 2018 involving 22 PMs from 19 language service providers (LSPs). The participants were recruited through emails sent by the Japan Translation Federation (JTF), Japan's translation company association which holds 250 corporate members, as well as notification on one of the authors' professional Facebook page. The selection criterion of the study was that they were engaged with translation project management duties in their work, even if this was as a supervisor, manager or in an associated role. This meant that the participants had different job titles, but in this article they are all referred to as PMs for consistency. People in a managerial role who were not involved in day-to-day project management were eliminated during the selection process to ensure that the participants had contacts with people in both upper and lower streams of productions.

The groups comprised 4, 5, 6 and 7 participants respectively (based on participant availability). The average size of the LSPs they worked for (number of employees) was 85 (the range went from 2 to 400 employees) and the average career span as a PM was 8.6 years (range from 0.75 to 20). Each focus group session lasted for 2 hours, moderated by one of the authors. The participants were asked to discuss 10 questions covering six topics (CAT tools, MT, training, crowdsourcing business model, communication tools, and what is most important out of these). The discussions were audio-recorded, transcribed by a professional company and analysed as explained in the next section. The focus groups were conducted in Japanese with quoted excerpts translated into English by the authors.

Data Analysis

In analysing the data transcripts, we acknowledge that qualitative research is subject to interpretation of the researchers and the same data may not be interpreted in the same way by all researchers. Instead of understanding this as a limitation, following the approach adopted by Anderson, Guerreiro and Smith (2016) in their study of education policy evaluation in the US, we made use of our distinctive career backgrounds to increase the validity of the study: the first researcher has a background as a freelance translator; the second as an owner and a manager of a localisation company. In addition, the first researcher had already conducted similar

research in the UK (Sakamoto et al. 2017) and the second researcher had carried out research on the productivity of machine translation (Yamada 2019). These variations in career and research backgrounds mean that the two researchers may have notably different ways of understanding the data due to their own ‘biases’. Instead of perceiving these variations in interpretation as a limitation, we adopt the “researcher-as-instrument” approach (Anderson, Guerreiro, and Smith 2016, 45), which uses the researchers’ biased perspectives as a valuable instrument that can add “important detail to shape a complete and valid story.”

The data analysis took two stages. In the first stage, the first researcher coded the data in the qualitative analysis software NVivo, using a grounded theory approach (Glaser and Strauss 1967), and identified commonly occurring concepts in the discussions. This involved two steps of coding (Richards and Morse 2007, 177–183): the first ‘open coding’ involved coding segments of the data while freely generating concepts (which included both ‘in-vivo’ codes, which use expressions used by the focus group participants and ‘a-priori’ codes which are generated by the researcher’s own knowledge of the topics). The researcher listened to the recording of the discussions while conducting this first step analysis so that nuances hidden in non-verbal expressions such as silences or laughter would not be missed. The second step of “category search” involved identifying common themes across those concepts identified in the first coding step and generating more abstract concepts.

In the second stage, the second researcher scrutinised the concepts generated by the first researcher and the segments of the transcript data which support the concepts, checking the agreement between the two. He also read all the transcripts to examine how each concept appears in the course of the discussions and whether the concepts generated fit the context. He noted any points he did not agree with the first researcher. The two researchers then discussed the variations in their interpretations to formulate an agreed narrative.

Although the data was collected in a certain regional area, Japan, we noticed that most issues discussed in the focus groups represent universal issues with universal characteristics. We came to this conclusion after comparing the outcomes with the previous UK study (Sakamoto et al. 2017) as well as other research on the topic. In addition, out of the 19 LSPs the participants worked for, 8 LSPs (42%) offered MTPE services. This percentage is much higher than in the recently published data in Japan (Japan Translation Federation 2018), which indicated a rate of 15.6%. This figure is

much lower than western counterparts, such as the UK's 41% (Dranch 2016) and Spain's 47% (Presas, Cid-Leal, and Torres-Hostench 2016). Japanese LSPs' low uptake of MT may be due to the lower quality of MT in the Japanese/English language combination (Isahara 2015, 315) and it can be understood that this specific participant sampling represents a relatively tech-savvy group in Japan's translation industry but is comparable with western counterparts. Nevertheless, some outcomes of the study are specific to Japan, which will also be highlighted in the discussion below.

The source of data supporting the claims in the next section is provided in the footnotes, indicating the name of the coding category, the number of references made in the discussions and in how many groups the references occurred: “[10 references/2 groups]” means 10 references made by participants in 2 focus groups were coded with the particular concept.

3. Findings

We reported the general outcomes of the overall study, covering six topics covered in the focus groups, in an industry report (Sakamoto and Yamada 2019). Some of the results were also discussed in Sakamoto (forthcoming), focusing on the symbolic value of the work of translation and the anxiety felt by translators in an increasingly automated translation environment. The present article takes a different approach, focusing on the data related to MTPE and analysing it using the SCOT method in order to investigate how the translation community has been shaping the practice of MTPE. More specifically, the analysis was carried out on the data collected through the question: “Do you think MTPE will overtake the traditional translation process?” The purpose of this question was not to get a black-and-white prediction about the viability of MTPE, but to prompt the participants to discuss different aspects of MTPE while trying to answer the question. It examined MTPE as a new work practice with considerable interpretive flexibility for different social groups. The findings below explain who these groups are and what meanings each group attaches to MTPE.

Project Managers

First of all, amongst the PMs who participated in the study, two relevant social groups were identified according to the level of knowledge and enthusiasm regarding MT,

whom we call here ‘MT enthusiasts’ and ‘MT sceptics’.¹ It seems that the division was caused not by the individual PM’s attitude to MT only, but also by their positions in their workplace. PMs who worked in a section in the LSPs where MT was actively used had more positive attitudes to MT than those who did not. MT enthusiasts notably drove the discussions in the focus groups. However, the existence of MT sceptics should not be ignored. One participant admitted at one point: “I don’t understand what you are talking about at all.” (G1-4) As her work dealt with human translation projects only, she had had no opportunities to learn about MT. PMs often associated the discrepancy of these two groups with the size of the LSPs, as smaller LSPs tended to have fewer resources necessary for MTPE (see also below in The Management of LSPs). Those who did not use MT in their work were more sceptical about MTPE, or felt left out of the current trend and had a sense of anxiety about the situation. One participant’s account illustrated this: “I work in the same industry (as other participants), but as I don’t use MT or other technologies in my work, I won’t be of any use if I change job and move to a different company.” (G1-1)

Clients

In talking about their clients, PMs indicated, broadly speaking, there were, again, two types of clients in the current MTPE market: MT sceptics and MT enthusiasts.² Some clients were sceptical of MTPE because they were worried about the quality of the end products as well as the security of their data (source texts). The quality issue may be particularly relevant to Japanese-English MT, but at the same time, MT enthusiasts also said “the (clients’) tolerance level for low quality translation is becoming higher” (G1-2) and “people are getting used to reading funny-sounding Japanese texts.” (G1-5) The clients were also interested in knowing whether other clients were using MTPE services. The same PM predicted, “once clients’ demand for MTPE in comparison to human translation increases, more and more LSPs would move to MTPE services” (G1-5) and “LSPs are worried that they will not have enough business in the end if they don’t offer MTPE services.” (G1-2) This suggests that the prevalence of MTPE services was perceived to be client-driven and the drive is intensifying, with clients asking for faster and cheaper services using MT.³ PMs also

¹ “Isolation” [3 references/2 groups]

² “Clients’ expectation” [24 references/4 groups]

³ “Cost and profit” [24 references/4 groups]

indicated there were two sub-groups in MTPE service users: those who wanted faster service at the cost of quality (“[clients] don’t need a high-quality translation but want it quickly,” [G1-2], and the others that wanted “the same level of quality [as human translation] at the MT price.” [G2-3]) This indicates that those two sub-groups interpret the meaning of MT in different ways.

With the increasing pressures for lower prices from clients, securing comfortable margins was becoming a challenge for LSPs. A small number of participants said that, if the LSP already owned a good quality proprietary MT system (i.e., there was no cost for producing raw MT outputs), and “maintains a certain level of rates, MTPE services can generate more lucrative business than human translations.” (G2-1)

However, other participants stressed that “the pressure from clients for lower prices is much stronger” (G1-2) and clients now believe that “lower prices are the only justification for introduction of MT in the translation services.” (G3-1) In this situation, keeping high margins from MTPE is a tough call. LSPs were trying to find an optimum MTPE pricing model (“We are testing different methods” [G4-3]), but “the best method has not been identified yet” (G4-3) or the LSPs were “not clear about how much margin we (LSP) should aim to secure.” (G2-1) However, the same PM also stressed that maintaining reasonable profits from MTPE would be possible if “LSPs published their pricing policies clearly in advance.” (G2-1)

Client profiles also influence how LSPs design MTPE services. The clients' location is one such example. One participant said most of his clients were small local companies located in a remote town away from the Japanese capital, suggesting that the clients' awareness of the global standard of translation was low (“The quality of their translation is not that different from MT outputs [laughs].” [G4-1]) On the other hand, another participant (G2-2) talked about one of her clients whose parent company was located in Germany. In this case, the German parent company demanded that the Japanese subsidiary company (the LSP’s client) use MTPE services on the back of the parent company’s success story of MTPE adoption, but the Japanese client could not achieve the same level of success as English/Japanese MT output is not at the same standard as English/German MT.

These accounts illustrate that the high interpretive flexibility of MTPE is creating vastly different meanings of MTPE for different social groups amongst clients. As a result, PMs need to handle a variety of demands from the market. In other words, there is no single entity called ‘the MTPE market’. One PM expressed her worries

that, in this situation of multi-faceted market demands, LSPs' operational models may eventually be "forcefully shaped by the demands of a certain group of clients." (G4-3) This indicates that the situation is in a precarious state, which can tip in any direction depending on how those social groups negotiate and interact with each other.

The Management of LSPs

The participants took part in this study as individuals, not as LSP representatives, and their employers were not informed about their participation. This point was clarified in the recruitment process. As such, although the participants often used examples of their companies to illustrate their points, they were asked to express their individual opinions in the discussions. However, admittedly, the LSPs' management policies influenced their professional behaviours and opinions. In these cases, the relevant social group at stake was that of the management teams of LSPs, which have decision-making power over the PMs' operations, although this actor group was described in less explicit terms in the focus groups such as 'our company' or just 'we' (often with the word '*uchi*' in Japanese; a word also used to mean 'my home' or 'my house').

As mentioned above, 8 out of 19 LSPs (42%) who took part in the study offered MTPE to their clients. These figures allowed us to identify two obvious relevant social groups in LSP management teams: one that offers MTPE services and one that does not. However, this grouping is in reality not quite accurate as one participant's account reveals: "Our company does not own good enough MT systems nor sufficient resources or know-how of MTPE services, but nevertheless, we had started to offer the service to a limited number of clients on a case-by-case basis." (G4-6) This suggests that some LSPs are at a trial-and-error stage of MT adoption, but this transition stage is not evident to the external parties. For instance, the provision of MTPE is not stated on their websites.

Different factors seemed to influence the management team's decisions regarding MTPE policies.⁴ One such factor was the location of the LSP, or its parent company if they had one. Five of the LSPs the participants worked for were multi-national LSPs, whose parent companies were based outside Japan. Some of the parent companies developed their own MT systems. In these cases, the Japanese LSPs tended to be

⁴ "Management" [24 references/4 groups]

more open to MT use. The size of the LSP was another factor. One PM, who worked for an LSP with 20 employees, admitted that her LSP was not capable of handling a huge volume of MTPE in a short time as “our resources are not so large.” (G4-2) PMs’ accounts also indicated that existing personnel profiles of an LSP could also influence the LSP’s policy about MTPE adoption. A good example is the case of ‘native checkers’. ‘Native check’ is a common service offered in Japan whereby a Japanese translator translates a text from Japanese into English, which is then proofread by an English native speaker. This service is common in Japan due to the general deficit of native speaking Japanese-English translators. One participant said her company had a large pool of native checkers, who, she thought, would be good candidates for post-editors if the company started to offer MTPE services (G3-3). Another participant (G4-5) said her LSP’s management only hire PMs who have high-level language skills and she thought their PMs would be capable of doing post-editing work. This could mean this LSP would be able to operate MTPE services within a unique workflow involving PMs. These different factors, therefore, constitute criteria of different social groups of LSPs.

Translators

PMs’ accounts also illustrated two types of translators: those who tend to reject MTPE work and those who are willing to take it on. The former types are ‘traditional’ translators who are “proud” (G2-5) professionals who “love to write texts” (G3-4) and “to create texts from scratch in the way they like.” (G1-5) For this group of translators, translation “is interesting work.” (G1-6)⁵ On the other hand, the new types are the “strange” (G1-5) translators (in the sense that they are not typical of the kind of translators PMs know traditionally) who preferred to correct existing translations, rather than to produce translations from scratch, as it involves less manual and cognitive effort, making the work “easy.” (G1-2)⁶ In addition to this dichotomous grouping, PMs described other types of translators. A prominent group was the “fast and cheap translators.” (G3-2) They were translators who belonged to the traditional group, but LSPs used them mainly for projects which were not lucrative but required a fast turnaround. PMs perceived them as being low down in the translators’

⁵ “Reluctant translators” [15 references/4 groups]

⁶ “Willing translators” [6 references/4 groups]

hierarchy, but those translators were still needed to cater to different needs in the market. PMs claimed MTPE services would provide suitable job opportunities to this group of translators.

This leads to the important question of who is suited to work as a post-editor.⁷ The focus group discussions provided two conflicting opinions. One opinion was that post-editing work requires the level of linguistic skill and specialist domain knowledge as high as those of skilled translators. In addition to fixing MT errors, post-editors need to have the “skills to choose the right terminology” (G2-1) or “produce a (target text) sentence from scratch if the MT output is not good at all.” (G2-4) The other opinion was that post-editing should be regarded as a different job from translating, and that a different group of workers are more suited to the job. In PMs’ opinion, those workers included: people who already work as reviewers; bilinguals who have received post-editing training; or a team of workers, instead of just one post-editor, consisting of a translation reviewer, a terminology checker and a quality assurance (QA) engineer. Some participants suggested PMs themselves are suitable for the job if they have sufficient language skills. One participant (G2-1) said he did post-editing work alongside his project managing work. In addition, notably, one participant even said she thought, “at a stretch, even high school students who like studying English and checking Japanese sentences can probably do the job well.” (G3-4)

PMs also suggested personal qualities were important recruitment criteria. The suitable personal qualities for post-editors suggested by PMs included: flexibility, an eye for detail, quick decision-making, willingness to obey rules and passiveness. And echoing what PMs said about the ‘traditional’ translator as mentioned above, one participant said:

Most translators say the joy of translating is in creating something from scratch, in creating beautiful translations. These people normally hate post-editing, but occasionally you meet translators who don’t like translating. It makes me wonder why they are working as translators though [laugh].

(G1-5)

This account implies that translating and post-editing are jobs with notably different characteristics, which require groups of workers with different personal qualities. This

⁷ “Ideal post-editors” [36 references/3 groups]

way of thinking, however, may require careful consideration. In the focus groups, while one participant said finding capable post-editors is “a matter of compatibility (between the personality and the nature of post-editing work),” (G2-5) another said it was not the problem of compatibility but the nature of post-editing work itself that was making recruitment difficult: “If the original translation is of bad quality, the revisor needs to reconstruct the sentence from scratch, which is just agony, although this is often put down to the matter of a bad match (of personality).” (G3-1) This account suggests that the successful execution of MTPE may easily be attributed to the capability of post-editors, and if it is unsuccessful, the blame may be put down to the post-editor’s personal qualities (that he/she is not suited to post-editing work). However, the important point here should be, instead, the provision of clear guidelines on post-editing to ensure successful execution by all post-editors. In the discussions, several PMs said MTPE guidelines were not set clearly enough for post-editors (“It is not clear to the post-editors how much they are expected to edit. That’s why they sometimes over-edit and other times under-edit.” [G3-2])

With regard to translators’ career paths, interestingly, no participant expressed concerns that translators’ skills would be degraded by doing the job of post-editing. Instead, there was an agreed opinion that inexperienced translators who start their career as post-editors may be upgraded to the rank of fully fledged translators on the LSP’s books if they can demonstrate high linguistic abilities through post-editing. The analysis above shows how PMs recognise different social groups amongst translators in relation to MTPE and that there is also some disagreement in the categorisation of the groups. Categorisation of different types of translators has been attempted in translation studies too, using variables such as the way they handle emotions caused by translation work (Hubscher-Davidson 2018) or the suitability of the kinds of source text for different types of translators (Reiss 2000, 109–113). Also, process studies commonly categorise translators between professionals and students according to the patterns in their translation processes (see Göpferich and Jääskeläinen 2009 for such studies). In contrast, our analysis shows that PMs used much more detailed categorisations of translators, which was presumably possible due to their unique positions as PMs.

4. Discussion

Our analysis identified four social groups (project managers, clients, the management of LSPs and translators) and their sub-groups involved in MTPE. It also examined what meanings these groups attach to MT and MTPE according to their own objectives and expectations. The different interpretations about a technological artefact lead to conflicting images of the practice and controversies within the community (Klein and Kleinman 2002, 428). We believe MTPE is exactly at this stage now. In the SCOT framework, a closure mechanism is expected to happen at one stage of this controversial period, and as a result, a dominant model will emerge. In order to find out how a dominant model will emerge in MTPE, it will be important to consider how the closure mechanism will take place in the translation community. Two closure mechanisms are recognised in SCOT: “closure by redefinition of problem” and “rhetorical closure.” (Pinch and Bijker 1984, 425) In “closure by redefinition of problem,” a closure is achieved not by solving a problem but by attaching a new meaning to the problem so that it no longer poses problems to social groups. Our analysis shows some examples of this mechanism in action. For instance, some PMs said some of their clients attached the meaning of ‘time saving’ to MT and those clients were happy to pay the same level of fees as human translation to MTPE, because the purpose of MT, for them, was to save time. On the other hand, other clients attached the meaning of both ‘time saving’ and ‘cost saving’ to MT, thus they demanded translations at the same level of quality as human translations at a lower cost in a shorter time. For these two sub-groups of clients, the definitions of problem were different: ‘time’ for one and ‘time and cost’ for the other. This is where a closure mechanism enters. We presented a PM’s account which described a client who had asked the PM whether other clients used MTPE or not. The client’s understanding of the meaning of MT may change after learning about their counterparts’ practices regarding cost and turnaround of MTPE. If the clients redefine the problem they try to solve using MTPE, the problem is solved as far as they are concerned. This process will then encourage a standardisation of practices.

Another example of “closure by redefinition of problem” could be observed in the PMs’ interactions with each other during the focus group discussions. PMs sometimes asked each other about their practices, such as the level of fees or what software they used. The exchange of information within a relevant social group will assist the redefinition of the problem and help form a new, more stabilised definition of the problem within the group.

The examples above are what we term ‘bottom-up’ closure mechanisms; behaviours of individuals which may lead to the stabilisation of practices. ‘Top-down’ closure mechanisms by “redefinition of problem” can be observed in the industry too. In talking about MTPE guidelines, one participant mentioned TAUS’s (Translation Automation User Society’s) MTPE guidelines: “Some clients set their own post-editing guidelines by adapting TAUS’s guidelines.” (G3-4) TAUS provides MTPE guidelines as an industry-wide initiative. TAUS’s publications, for example, disseminate the interpretation of MT by the social group of pro-MT actors, most prominently multinational LSPs and big technology companies (TAUS n.d.). Their report “MT Post-editing Guidelines” (Massardo et al. 2016) is a good example of a vehicle for a top-down closure mechanism. The report explains TAUS’s interpretation of best practice of MTPE based on their research and experience.

Another example is ISO 18587 (see, for example, the UK adaptation in The British Standards Institution 2018), which was established in 2017, led by LSPs which were already engaged with MTPE services (Association of Translation Companies 2017). By defining the required MTPE production process, the ISO aims to regulate an industry-wide MTPE standard. The idea behind this standard is, in SCOT terms, that the problems to be solved by MT are defined in this standard, and if all LSPs follow this standard, the problems will be solved in the most effective and efficient way. In our study no participant referred to ISO 18587, perhaps because this is a relatively new standard. However, following in the footsteps of ISO 17100 for human translation, this standard is expected to act as a closure mechanism to bring in more standardised MTPE industry processes.

In “rhetorical closure,” a closure occurs when the problem ‘disappears’ when the members of social groups ‘see’ the problem being solved. This is done through influential rhetoric such as advertisement (Pinch and Bijker 1984, 427). It is not possible to link our dataset to any such influence, but the recent hype-ridden discourse about AI in various technological fields, including translation, would be worth noting; this kind of rhetoric is highly likely to influence the perceptions of social groups (cf. Pielmeier 2019). The scientific community plays a role too. The research paper “Achieving human parity on automatic Chinese to English news translation” published by the MT development team at Microsoft (Hassan et al. 2018) is one good example, as it is published by a prominent research group. Much of the discourse of the PMs who appreciated the recent high-quality MT outputs echoed this research

paper's claim (for a critical response to these claims, see Läubli, Sennrich, and Volk 2018; Toral et al. 2018).

Here, we should remember that the sites in which a closure occurs offer room for the political will of social groups to operate, and as a result, power struggles ensue. One example from our analysis was where, in buying MTPE services, some translation clients tried to position themselves dominantly against LSPs in order to receive good-value services. The reactions to this pressure from clients were different in different groups of LSPs. Some considered it a natural consequence as their clients were now happy with the lower-quality target texts produced by MTPE. Some resisted because lower fees from clients meant squeezed margins for post-editors. This shows that each group struggled to achieve the most favourable form of closure of the controversial status of MTPE. And the results of these struggles will affect translators' and post-editors' positions in the economics of translation, with the possibility of marginalisation and disempowerment if their wills are not reflected in these struggles. Power struggles are not only economic; they can be emotional too. One participant was somewhat critical that some translators were averse to MT, but he also acknowledged that "(the reputation of our business) has been established on the back of these people's (translators') contributions." (G3-10) Now that MTPE had arrived, the LSP had to offer post-editing work to competent translators and, if the translators refused to take it on, the LSP had to offer it to new translators and post-editors. Otherwise, the LSP's position in the market would be at risk. The PM felt bad that he was unable to offer enough human translation projects to their long-serving translators due to the arrival of MTPE.

Our analysis revealed the complexity and multiplicity of relevant social groups and the negotiations between them, which were intertwined with different interpretations of and attitudes about MTPE. Our analysis, however, did not identify any promising signs of closure to the interpretative flexibility of MTPE. Our understanding of the reasons behind this is that PMs themselves do not regard MTPE as a promising business model. Instead, PMs believe that polarisation of the translation market would occur between raw MT output and human translation⁸. In certain specialised fields such as legal, IT, patent and medical translations, PMs were confident about the quality of recent raw MT ("The MT developers of our parent company says our legal

⁸ "Human translation vs raw MT polarisation" [17 references/4 groups]

MT engine has a 95% accuracy rate” [G2-5]; “the MT now produces almost perfect translation in the IT domain.” [G1-2]) On the other hand, PMs foresaw that context-dependent texts which require in-depth research for translating, culture-laden texts including humorous texts, or texts which need highly specialised domain knowledge would still require human translations (“Some projects require translators who have specific technical backgrounds. These projects will continue to have human translations.” [G1-2]) PMs’ mistrust of the viability of MTPE seem to be further strengthened by the difficulties PMs are experiencing with MTPE, such as the lack of optimal pricing models, recruitment methods and workable guidelines. MTPE is, in PMs’ eyes, a transitional service before sufficiently good-quality raw MT outputs become available. In this scenario, closure would not arrive for the interpretative flexibility of MTPE.

5. Conclusion

This article examined PMs’ discourse collected in a focus group study to discover how different social groups and their sub-groups involved in MTPE perceive the practice, what meanings they attach to it and how they negotiate the meanings through closure mechanisms. In this examination, it is important to be aware that the political will of stakeholders plays a role in the way the closure occurs, which will influence important social aspects such as the translators’ and post-editors working conditions, cost and profit distribution in the production system and the relationships between translators/post-editors and the LSPs. We conclude that the practice of MTPE has not reached a stage of closure, with multiple understandings of the practice currently circulating in the industry. Some efforts to achieve a closure was observed, but obstacles such as the lack of optimal pricing models, recruitment methods and adequate post-editing guidelines are making the closure difficult to materialise. We consider it highly likely that MTPE will remain a transitional service model until the translation market becomes completely polarised between good-quality raw MT outputs for some domains and human translation for others.

This article’s contribution is twofold. First, using the framework of SCOT, we proposed an effective analysis method to identify sub-groups of different social groups, which enables the observation of intricate negotiations between them in the power struggles to occupy an advantageous position in the MTPE operations. Second, although the study discussed the research outcomes as universal issues observable in

the global translation market, it also identified some Japan-specific phenomena, which filled the gap in literature relating to this less studied research site. These phenomena included: translation clients' relatively strong misgivings about MTPE due to the comparatively low quality of Japanese/English MT; disagreement about the usefulness of MT between Japanese companies and their western parent companies (in both LSPs and their clients); and the unique workforce composition in Japan (such as English-speaking 'native checkers').

This research is exploratory. Observation of the closure mechanisms in MTPE should continue so that we can ensure the fair and ethical development of MTPE practice for all stakeholders, particularly for the social group of freelance translators and post-editors, who have less social agency for such negotiations and are at risk of marginalisation and disempowerment in the MTPE workflow; they are, however, crucial social groups for a sustainable growth of the industry.

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Author’s Address

Akiko Sakamoto (University of Portsmouth, UK)

<http://orcid.org/0000-0001-9120-3089>

University of Portsmouth

School of Languages and Applied Linguistics

Park Building

King Henry I Street

Portsmouth, PO1 2DZ

United Kingdom

akiko.sakamoto@port.ac.uk

Masaru Yamada

Kansai University

Japan

myamada@kansai-u.ac.jp