Migration and translation technologies

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INTRODUCTION

This chapter brings together the topics of migration and translation technology. Both migration and translation technology are fluid phenomena that take a variety of forms and are subject to rapid evolution. Both have blurred conceptual boundaries, lack uniform terminology, and have been repeatedly (re)defined, even if often only implicitly. Given the exploratory orientation of this edited volume, in this chapter we adopt widely-encompassing definitions of both phenomena.

Migration is understood as an umbrella term that subsumes different types of "geographic mobility of people," ranging from diaspora and economic migration to political asylum, exile and nomadism (Polezzi 2012, 102). Connected to the concept of migration is the concept of migrant, which is here understood broadly as any "person who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons" (International Organization for Migration 2011, 132). We thus see the concept of migrant as an overarching notion, subsuming the concepts like immigrant, refugee, or asylum seekers.

As regards translation technologies, similar to Sin-wai (2023), Olohan (2020) and O'Brien (2019), here the term is used to denote a wide spectrum of digital technologies that aid translation tasks or generate translations. These technologies may require "various degrees of machine or human assistance" (Bowker and Fisher 2010) and work either as standalone or integrated tools. They may or may not have been primarily designed for translation purposes, be this translation interlingual (from one language to another), intralingual (within one language and involving reformulating the text in some way), or cross-modal (e.g. text to speech translation or vice versa). Examples of such technologies include:

- translation memory, i.e., "a database of bilingual (source and target) segments" that "allows translators to reuse previously translated content" (Rothwell et al. 2023, xxii);
- terminology management systems, which help "translators manage terminology efficiently (e.g. by extracting, storing and retrieving terms, among other tasks)" (Rothwell et al. 2023, xxii);
- translation environment tools, i.e., integrated suites of tools, typically including translation memory, that work in close association with a terminology management system (Bowker and Fisher 2010);
- translation management tools, used for the "management of human and technical resources (files for translation, associated glossaries, TMs [translation memories] etc.)" in translation projects (O'Brien 2019, 870);
- machine translation (MT), used for the "the automatic production of a target-language text on the basis of a source-language text" (Kenny 2022a); this target-language text can then be edited by a human to ensure correctness and fluency (in which case we talk about post-edited MT), or used in an unedited form (known as raw MT output);
- fixed-phrase translators, i.e., applications that rely on a predefined list of humanly pre-translated sentences. In the healthcare context, these pre-translated sentences usually cover simple common medical questions used for diagnosis that entail a yes or no answer from the patient or short answers (e.g., Turner et al. 2019);

- text improvement tools, i.e., those which allow "an author to write content and run automatic checks to see if that content has breached any of the stylistic rules encoded in the tool" (O'Brien 2019, 537); these tools might be used to help edit the source text to be submitted for MT, so as to minimise the risk of errors when the text is translated into another language (a process known as pre-editing);
- summarisation tools, capable of rewriting and shortening texts, for example to ensure efficient rendering within the same language (e.g., in expert-to-lay communication),
- speech technology, i.e., tools for speech-to-text or text-to-speech conversion (the former transcribes spoken language to written text in real-time; the latter converts written text into spoken audio (Ciobanu and Secară 2019);
- large language models, which can perform some of the text generation tasks mentioned above, such as text summarisation, rewriting and editing or MT.

There is growing evidence that translation technologies are used to enable communication between migrant and host communities. A recent example that attracted public attention was the use of one such technology, namely MT, in the vetting of Afghan asylum claims in the USA (Respond Crisis Translation 2023). This and many other cases make it clear that, like any other form of technology, translation technologies bring about benefits and opportunities but also disadvantages and risks. On the one hand, these technologies can help streamline processes, increase productivity, cut costs, and provide more individuals and institutions with quicker access to more texts than ever before. On the other hand, uncritical use of these technologies can dramatically affect people's lives. For instance, in the above-mentioned case of Afghan migrants, MT is reported to have distorted the meaning of document passages submitted for translation by changing singular into plural (mistranslating 'I' as 'we'). This, in turn, led to inconsistencies between the asylum documentation and initial interviews, eventually contributing to the judges' decisions to reject the migrants' claims. Moreover, big tech companies that run translation technologies may have the right to retain and reuse users' data that was submitted for translation (e.g., their health information or contact details), thus placing migrants' privacy and lives at risk (Moorkens 2022).

The complex role of translation technologies in migrant scenarios is only now starting to be more widely researched. Some translation scholars have stressed that different people require different levels and types of MT literacy (Kenny 2022b, v) and, by extension, translation technology literacy. They also emphasise that, to offer meaningful expert guidance on how society should use these technologies responsibly and critically, we first need to know more about their use in specific contexts.

To help address this knowledge gap, raise the visibility of technologies among relevant stakeholders, and ensure that research can keep up with rapidly evolving practices and generate evidence-based advice for policymakers and organisations working with migrants, this chapter seeks to explore what we know and what we still need to learn about the use of translation technologies in migration scenarios.

To this end, in the remainder of this chapter, we first discuss the methods and the results of our structured review of research publications intersecting migration and translation technologies; we then zoom in on one authentic migration situation that lays bare the complex scenarios that arise from the use of translation technologies in migrant-host community health communication; and, to conclude, we outline pressing questions derived from the meta-analytical approaches presented here, in the hope that future studies at the crossroads of Migration and Translation and Interpreting Studies might adopt them as starting points for interdisciplinary research.

METHODS FOR THE STRUCTURED LITERATURE REVIEW

To complete a structured literature review, searches were conducted using several generalist multidisciplinary online databases and translation-specific online databases in the first half of 2023.

In the first instance, we performed searches for records on generalist online databases, namely Google Scholar, Web of Science, and WorldCat. In a second phase, searches were focused on Translation Studies databases, namely TSB (Translation Studies Bibliography) (Gambier and Van Doorslaer 2004) and BITRA (Bibliography of Interpreting and Translation) (Franco 2001). These searches were based on combinations and variations of the terms 'MT' OR 'Google translate' OR 'language technology' OR 'translation technology' OR 'large language models' OR 'AI' AND 'refugees' OR 'migration' OR 'migrants' OR 'immigrants'.

The resulting 49899 search results were initially screened based on their abstracts. Eighty-three publications were pre-selected at this stage. These were then read, and a subset of records were retained for the analysis based on the following criteria:

- Date of publication: Our review has no limit in terms of date period.
- Thematic scope: The aim or the research questions are directly related to the topics of migration and translation/language technologies. For example, participant-oriented studies that address migration and where the findings indicate that the participating migrants use MT to overcome language barriers are not included if the study's aim does not focus specifically on this practice. This ensures that the records are fully relevant to the scope of the review.
- Type of publication: All included records were peer-reviewed and published in non-predatory scientific outlets. Our review, therefore, excludes unpublished theses, pre-prints, conference abstracts, or orally delivered conference papers, as well as letters to the editors, industry reports and blog posts.

We decided to exclude studies that focus on the use of MT in specialised fields of knowledge (like medicine or law) but do not intersect this focus with the topic of migration (e.g., Vieira, O'Hagan and O'Sullivan 2021). Although we recognise that there are thematic overlaps that might be worth looking into, we opted to leave these for later stages of research to ensure that our main topic (translation technology and migration) is not diluted and remains the focus of attention throughout.

Based on the criteria outlined above, our analysis focused on 16 records. A visual representation of the review process is provided by the flow chart presented in Figure 1.

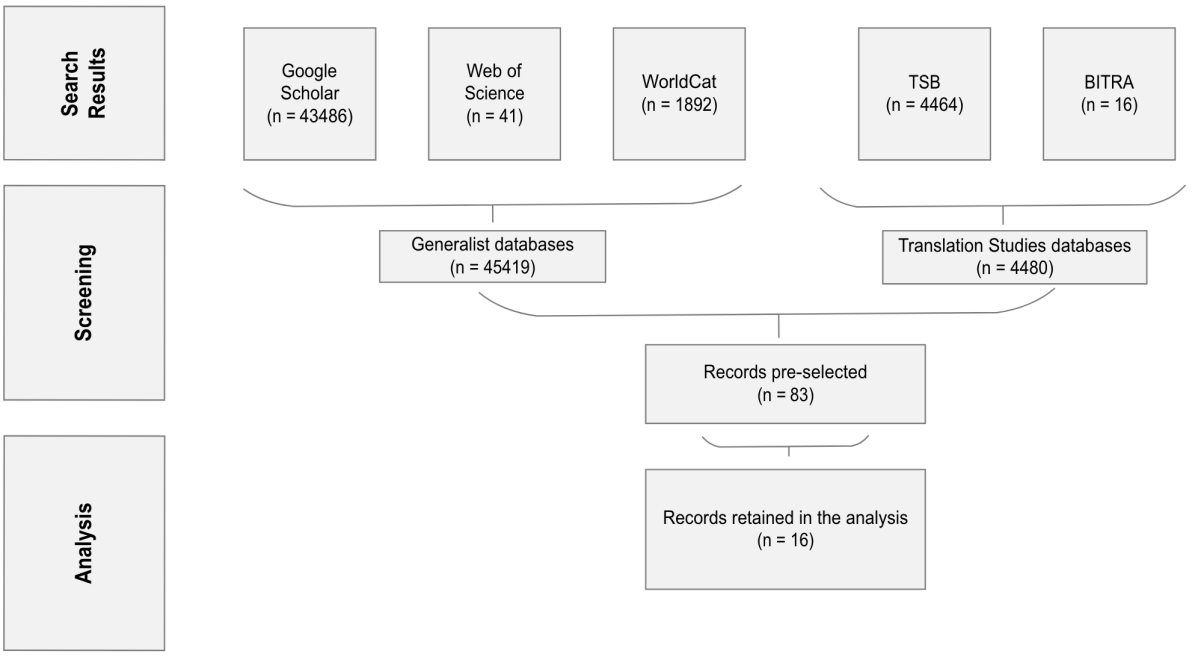

Figure 1. Summary of literature review process

To analyse these publications, we followed the models provided by the structured literature reviews in Kruger and Doherty (2018), Vieira, O'Hagan and O'Sullivan (2021) and Pięta, Ivaska and Gambier (2023). Our analysis focused on several aspects of the texts– such as the setting (for instance, healthcare) or the geographical area (for example, Canada) which were the focus of research – with the ultimate aim of identifying both what we have learned so far about how translation technologies are used in migratory contexts and what the blind spots are. We grouped the reviewed literature according to these key aspects and we present the analysis of the results of this meta-analysis in section 3.

Similarly to Pięta, Ivaska and Gambier (2023), we drew on classifications presented in Saldanha and O'Brien (2013) and Williams and Chesterman (2002) to categorise the studies in terms of research approaches (i.e., questions asked and methods used). We are reasonably certain that, at the time of writing, we have identified a fairly complete list of publications that are relevant to our aims.

We used the reference-management tool Zotero to save, manage, annotate, and share with the wider community the analysed subset of records (https://www.zotero.org/groups/5140765/migration_and_translation_technologies). In doing so, we aim to make it possible for other researchers to replicate our findings and build on our work.

RESULTS AND DISCUSSION OF STRUCTURED LITERATURE REVIEW

Although the initial search for publications yielded a high number of studies that touched upon the use of translation technologies in contexts of migration, the goals or research questions of many of these either did not address migrants or migration or did not focus specifically on translation technologies. The use of translation technologies in migratory contexts is frequently referenced in key publications, but often in a cursory or tangential manner. For example, Ciribuco (2020) conducted semi-structured comprehensive interviews with migrants from various African countries living in Umbria (Italy) to investigate the role of translation in the everyday lives of these migrants. During the

interviews, several migrants reported that they use MT, however this is not the focus of the study, which was therefore excluded from the analysis.

As already mentioned, in the end, sixteen studies met the review's inclusion criteria. A summary overview of these studies can be found in Table 1. Most of these (10 out of 16) are first-authored by Translation and Interpreting Studies scholars but were issued in publication outlets primarily aimed at readers in other fields of knowledge. This suggests that the use of translation technologies in migration contexts is creating opportunities for interdisciplinary knowledge-sharing and leadership, and that translation scholars are making use of these opportunities. This, in turn, might be interpreted as an emerging sign of the so-called outward turn in translation technology research (Bowker 2023).

The studies included in the review were all published in the last eight years, with the first being Bowker and Buitrago Ciro's article in 2015. This is not surprising given that academic interest in adopting translation technologies, particularly MT, as a tool for multilingual communication used by non-language professionals is relatively recent (see Nurminen (2021) for a thorough review of the literature on the topic). When researching translation technologies and MT in particular, most research within Translation and Interpreting Studies has been on using MT as a tool for translators and other language professionals. We see this trend as expected. Most translation researchers are or were, at some point, translators in some capacity (Torres-Simón and Pym 2016). Therefore, it is logical for them to centre their attention on the work of translators: it is the context that these translation researchers are most familiar with, so it is reasonable to expect that they are particularly interested in translators' working conditions or in the tools in the translators' kit when training the next generation of translators.

Settings and geographical areas

Different settings are examined, with healthcare being the most popular with seven studies, followed by government with two studies. Bowker and Buitrago Ciro's (2015) study was the only one that focused on the library context, looking into the potential of using MT to offer an efficient and cost-effective means of translating sections of the Ottawa Public Library website aimed at Spanish-speaking migrants. Asscher and Glikson's (2023) study, on the other hand, zoomed in on a work-related setting and investigated end users' perceptions of MT and human translation in an ethically charged situation involving a disadvantaged migrant worker in need of a translation. Two studies explored multiple settings (Liebling et al. 2020; Pokorn and Čibej 2018), while in three studies the settings remained unspecified (Berbyuk Lindström et al. 2017; Macías, Ramos and Rico 2020; Ricart Vayá and Jordán Enamorado 2022).

The studies tended to concentrate on a limited number of geographical areas, with the majority centring on the European context (nine studies). The non-European areas covered by the remaining studies analysed are Canada, Australia and Israel. One study — the methodological and conceptual overview conducted by Ji, Sørensen and Bouillon (2021) — was non-specific in terms of geographical area.

Research approaches

The publications included in the review consist of fifteen empirical studies and one methodological and conceptual overview. Participant-oriented research seems to be the most prevalent approach among the reviewed studies (with 10 occurrences), adopting questionnaires, interviews, and focus groups as instruments or conducting user evaluations. Studies adopting this approach were concerned with users' perspectives about MT-mediated communication in migratory contexts or for migration-related content and surveyed a varied profile of participants. The surveyed users included

the migrants themselves but were not limited to them. Some studies elicited (additional) data from institutional agents (Angermeyer 2017), the general public (Asscher and Glikson 2023), healthcare professionals (Berbyuk Lindström and Rodríguez Pozo 2020; Panayiotou et al. 2020), travellers (Liebling et al. 2020) and translators (Macías, Ramos and Rico 2020). This preponderance of participant-oriented research suggests the importance of user-centred approaches in studying translation technologies and MT-mediated communication in migration contexts.

Product-oriented, process-oriented or context-oriented approaches are much less frequent in the reviewed studies. Three studies applied product-oriented approaches but with different, somewhat complementary, aims: O'Mara and Carey (2019) examined both peer-reviewed and non-peer-reviewed literature to identify successful approaches to using information technology for translating government information aimed at migrants with diverse cultural and linguistic backgrounds in Australia; Pym, Ayvazyan and Prioleau (2022) surveyed the use of Google Translate on the official website of the Catalan health service for the purposes of translating COVID-19 vaccination information; Berbyuk Lindström et al. (2017) discussed the accessibility and use of mobile resources among recently arrived Arabic-speaking migrants in Sweden, examining how these resources address their integration requirements through a combination of website and application analysis as well as focus group interviews.

Only one study among those analysed in our review adopts a process-oriented approach, namely Piccoli (2022), who explored the use of Google Translate to overcome language barriers during medical consultations. To do so, the author analysed a two-hour recorded interaction involving a newly arrived Albanian asylum-seeking family and a French general practitioner. Cox and Maryns's (2021) study is the only one that employed a context-oriented approach, zooming in on two consultations from a larger corpus consisting of 129 audio-recorded clinician-patient encounters.

Translation technologies

With the exception of Cox and Maryns (2021), all analysed studies addressed the use of MT in a migratory context, although the focus on this technology varied. In a way, all these studies shed light on the potential and usefulness of using MT, among other technologies, to overcome language barriers in migration contexts or for migration-related content.

These studies adopted a variety of complementary perspectives when it comes to who initiates the use of MT. For example, while Pym, Ayvazyan and Prioleau (2022) examined a case of MT use initiated by health services to communicate public health information, Valdez, Guerberof-Arenas and Ligtenberg (2023) analysed MT use initiated by migrants by investigating if, when, how, and with what (potential) challenges migrants in the Netherlands use MT in healthcare settings.

In some studies, MT is assessed alongside or in combination with other translation technologies. Among these are fixed-phrase translators, designed to facilitate multilingual communication with migrants in healthcare settings. Ji, Sørensen and Bouillon (2021) discuss BabelDr, a speech-enabled fixed-phrase translator accessible online (babeldr.unige.ch) and created by Geneva University Hospitals. Their study explored patient-focused and culturally effective healthcare and medical translation methodologies, as well as user-oriented criteria for new medical interpreting technologies, with a view to enhancing usability among patients from migrant, or other socioeconomically disadvantaged populations. To do so, the authors used this purpose-built medical translation application to explore the criteria required for developing and assessing translation technologies for safety-critical settings.

Panayiotou et al.'s (2020) study explored the attitudes and perceptions of older people with limited English proficiency (LEP) and of healthcare workers towards using mobile translation technology to

overcome language barriers in healthcare settings through focus group discussions with older people from culturally and linguistically diverse (CALD) backgrounds and nursing and allied health professionals. The fixed-phrase translators in the study are CALD Assist (Silvera-Tawil et al. 2018) and TalkToMe (https://talktome.svhm.org.au/). In both cases, the apps function similarly to a phrasebook, providing a curated selection of healthcare-related phrases translated into a target language and designed to be used when an interpreter is unavailable. The phrases can be heard aloud in the target language or presented visually through written translated text or images. They are meant to be used in low-risk situations and do not include phrases considered high-risk, such as those conveying consent (Panayiotou et al. 2019; Hwang et al. 2022).

Other studies compared the use of raw, unedited MT to human intervention (pre- or post-editing) or human translation. In particular, to explore the usefulness of using MT in the migratory context, Macías, Ramos and Rico's (2020) study conducted a focus group with translators working with or for non-governmental and non-profit-making organisations on their attitudes towards MT and post-editing tasks. Asscher and Glikson (2023) investigated end users' perceptions of MT and human translation in an ethically charged situation.

Complementary mediation strategies to translation technologies

Some of the studies we reviewed investigated a range of mediation strategies besides translation technologies. One such study is Pokorn and Čibej's (2018), which examined the mediation strategies used by migrants in Slovenia. These strategies included learning the host country's dominant language, public service interpreting and translation, translation technologies, lingua francas ("when two […] speakers use a language that is not their first" (Pym 2018)), and intercomprehension ("when each speaker uses their L1 [first language] and has at least passive understanding of the language of the other person" (Pym 2018)).

Berbyuk Lindström and Rodríguez Pozo (2020) conducted in-depth semi-structured interviews to explore the use of information and communication technology (ICT) by Swedish paediatric nurses and doulas in addressing communication challenges arising from language barriers and cultural differences during interactions with migrant mothers. Their study identified three main strategies adopted by these users: using formal and informal distance interpreting; using MT (which for these users equated to using Google Translate); and using images and films as a substitute for or complement to verbal messages.

Cox and Maryns's (2021) study examined the multilingual strategies used in emergency department consultations with migrant patients, including ad hoc communicative solutions such as lingua franca use, non-verbal communication, medical translation software, and language mediation through companions or hospital staff.

Findings

The evidence suggests that MT and other translation technologies (mostly fixed-phrase translators) – sometimes in combination with mediation strategies – are used as a response to communication challenges in cross-cultural interactions in migratory contexts. In some of the studies analysed, we see that MT, the main translation technology examined, is initiated both by migrants and by institutions or institutional agents.

Overall, users' perspectives regarding MT are mixed. Institutional agents and some end-users view it positively as a cheaper alternative to professional translators and interpreters, emphasising its usefulness for certain needs (mainly speed and cost). However, professional translators, migrants, and other end-users hold unfavourable opinions towards MT due to several issues: comprehension

problems, translation errors, difficulties using MT in high-stress situations, challenges for individuals with low literacy in their native language, concerns about accuracy and, in some cases, even output that is interpreted as offensive. (See, for instance, Angermeyer (2017) or Valdez, Guerberof-Arenas and Ligtenberg (2023).)

Asscher and Glikson's findings (2023) suggested that pre-existing beliefs and biases towards MT significantly shape users' perception and interaction with it. These biases can lead to unfavourable evaluations, affecting both translators and non-translators. However, the technology continues to evolve and users' expectations change accordingly, especially when confronted with better outcomes than expected.

Several of the studies pointed to questions that should be considered when MT is used in migratory contexts. For example, Bowker and Buitrago Ciro (2015) highlighted the importance of understanding the needs of the recipients, as this can help organisations to identify which texts are most needed by the community in question and prioritise them for translation. They also recommended writing source texts in a way that makes them easy to translate (translation-friendly). This is especially important if the source text is to be translated into multiple target languages, thus avoiding problems that would need to be addressed in each of the target texts.

Piccoli's (2022), and Pokorn and Čibej's (2018) findings emphasised that the use of MT is often combined with other resources or mediation strategies. Ricart Vayá and Jordán Enamorado (2022) argued that the effective use of MT requires simplifying language or structures, and shortening messages for accurate translation. Users need to have reformulation abilities for more effective communication with MT, and should possess inference skills to understand translations with medium-low fluency and intelligibility. The need for guidelines and training is also identified by Macías, Sánchez Ramos and Rico (2020) and Cox and Maryns (2021). These studies discussed the need for detailed guidelines or instructions for post-editing tasks or training for institutional agents, such as clinicians, on recognising and resolving communication challenges with migrants.

Finally, some studies highlighted that the use of MT and AI in healthcare and government information can potentially exclude migrants and individuals from linguistically diverse backgrounds if not carefully considered and evaluated. These studies called for more research to understand how migrants use AI and translation technologies. See, for instance, O'Mara and Carey (2019).

Study (Author, date)	Type of publication	Type of study	Setting	Geographical area	Approach	Methods
(Angermeyer 2017)	Journal article	Empirical	Government	Canada	Participant-oriented	Interview
(Asscher and Glikson 2023)	Journal article	Empirical	Work-related	Israel	Participant-oriented	Questionnaire
(Berbyuk Lindström and Rodríguez Pozo 2020)	Journal article	Empirical	Healthcare	Sweden	Participant-oriented	Interview
(Berbyuk Lindström et al. 2017)	Chapter	Empirical	Non-specific	Sweden	Product-oriented	Multimethod
(Bowker and Buitrago Ciro 2015)	Journal article	Empirical	Library	Canada	Participant-oriented	User evaluation
(Cox and Maryns 2021)	Journal article	Empirical	Healthcare	Belgium	Context-oriented	Case study
(Ji, Sørensen and Bouillon 2021)	Chapter	Methodological and Conceptual overview	Healthcare	Non-specific	N/A	N/A
(Liebling et al. 2020)	Conference paper	Empirical	Multiple settings	Multiple regions	Participant-oriented	Multimethod
(Macías, Ramos and Rico 2020)	Journal article	Empirical	Non-specific	Spain	Participant-oriented	Focus group

(O'Mara and Carey 2019)	Journal article	Empirical	Government	Australia	Product-oriented	Literature Review
(Panayiotou et al. 2020)	Journal article	Empirical	Healthcare	Australia	Participant-oriented	Multimethod
(Piccoli 2022)	Journal article	Empirical	Healthcare	France	Process-oriented	Corpus
(Pokorn and Čibej 2018)	Journal article	Empirical	Multiple settings	Slovenia	Participant-oriented	Multimethod
(Pym, Ayvazyan and Prioleau 2022)	Journal article	Empirical	Healthcare	Spain	Product-oriented	Corpus
(Ricart Vayá and Jordán Enamorado 2022)	Journal article	Empirical	Non-specific	Spain	Participant-oriented	Multimethod
(Valdez, Guerberof-Arenas and Ligtenberg 2023)	Conference paper	Empirical	Healthcare	Netherlands	Participant-oriented	Questionnaire

Table 1 - Summary of the studies included in the review and their main features

ZOOMING IN ON A RECENT MIGRATION SCENARIO

The structured review of research provided details on the intricacies of using translation technologies in migrant-host community interactions. To further unpack these intricacies, we now zoom in on one recent situation where there was a need to communicate with migrant communities, and one particular translation technology — MT— was deployed to meet this need. We reflect on how this technology was (and could have been) deployed, and on the implications of this use.

During the COVID-19 pandemic, it was vital that government information on how to reduce the spread of the virus reached different language communities living in particular regions in a timely and accurate manner. In Portugal, public health authorities privileged three portals as official channels of healthcare messaging. Mendes et al. (2023) used Arquivo.pt (https://sobre.arquivo.pt/en/) to retrieve fifty updated versions of these portals published between January 2019 and December 2022. Their diachronic analysis of these multiple versions looked, among other things, at whether, when and how an MT option was offered to users, and to what extent the raw MT content could be seen as reliable.

Their findings suggest that basic guidance on how to stay safe (for example, on how to wash hands) was made available through one-off, government-sponsored translations into several languages spoken by major migrant communities in Portugal. However, most of the vital health information, such as vaccination recommendations or updates on the constantly evolving healthcare guidance, was only available in European Portuguese or through Google Translate API. When clicking on the Google Translate icon, users were not offered any warning about the limitations and risks of using this technology. Those with low MT-literacy might thus be unaware that the text they received was generated not through deep understanding or awareness of real-life context, but instead by predicting the order of words on the basis of patterns in the data this AI-based technology had been trained on.

Moreover, while it is understandable why the content that users could submit for translation through Google Translate API was written in European Portuguese, this language choice increased the risk of mistranslations. This is because most languages used by major migrant communities in Portugal form low-resource pairs with Portuguese (e.g., Nepali, Mandarin, Russian, Ukrainian), and as such they were more likely to lead to substandard outcomes.

Furthermore, the original Portuguese content covering healthcare messaging included many instances that could be potentially difficult for Google Translate to render accurately, thus further increasing the risk of imprecise, inconsistent translations. These instances included long sentences, numerous pronouns, subjects positioned far away from the verb, all of which are known to be problematic for MT. Finally, Google Translate did not translate texts that were part of images, making some of the visual information inaccessible to non-Portuguese speakers.

While further research is required to fully comprehend the effective impact of deploying this form of translation technology in this specific migrant situation, insights from earlier studies (O'Brien 2019; O'Brien, Cadwell and Zajdel 2021; Pym, Ayvazyan and Prioleau 2022) provide groundwork from which potential implications of this particular use can be derived. On the one hand, it appears that through this use of technology, a significant number of migrants living in Portugal may have been left behind. This may have been the case with migrants who heavily rely on languages that have limited resources when paired with Portuguese. The provision of poor-quality translations could erode these migrants' trust in the Portuguese government's healthcare recommendations delivered through this technology, leading to reduced adherence to those same recommendations and potentially compromising public health.

On the other hand, there are several positive aspects to consider. In such a time-sensitive and high-stakes situation, using a lingua franca instead of facilitating MT into multiple languages would also alienate a significant proportion of the migrant population (even those who speak the lingua franca may not know it well enough to understand specialised healthcare terminology).

Timely recruitment and/or training of professional or ad-hoc citizen translators for all relevant language pairs was hardly possible in the limited timeframe available. Even if it had been, high quality could not be taken for granted (translators working under highly unstable conditions and time pressure are also prone to making mistakes).

Thus, using MT can be seen as justified: it allowed rapid access to updated information at a lower cost, which seems a better solution than zero translation. The risk of mistakes could have been reduced if the deployment of MT technology had been accompanied by pre-editing techniques, either with or without dedicated technology (e.g., text improvement tools). Another option, although not as time- and cost-effective, could involve using a translation memory program. This program could help rectify mistakes, foreground updates, and allow for faster post-editing. Delivering the recommendations in the form of a raw MT output could also be combined with other mediation strategies mentioned above, for cross-checking. Additionally, all these measures could likely be more effective if relevant stakeholders had the required level of MT literacy.

CONCLUSIONS AND OUTLOOK

Our findings indicate that research exploring translation technologies through the prism of migration (and vice-versa) is recent. There are signs that suggest an outward turn in translation technology research (Bowker 2023). The prevalent adoption of participant-oriented approaches allows deeper understanding of users' perspectives, yielding insight into the rich narratives of migrants and members of host communities. However, we still lack a comprehensive understanding of the processes and contexts in which translation technologies are used in migratory settings.

The data gathered by research at the nexus of translation technology and migration focuses on limited settings, with healthcare contexts attracting most of the attention. Many other, equally high-stakes settings have so far slipped below the radar of research in this area. For example, we know very little about the use of translation technologies in the different stages of the migration process, such as migrants' pre-departure activities or entry to the country of transit or destination. Additionally, while research on the use of translation technologies in migratory contexts has focused on the Global North, particularly European countries, little is known about how these tools can be used to mitigate language barriers in migratory contexts or for migration-related content in the Global South.

Furthermore, research on translation technologies in contexts of migration has focused on a limited number of technologies, mainly MT and to a lesser degree fixed-phrase translators. We need more research on other types of AI-based translation technologies, beyond or in combination with MT, and on other applications of natural language processing and artificial intelligence that enable migrant-host communication. For instance, we need additional information on migrants' use of other technologies (such as live transcription apps), whether or not in combination with MT; and on migrants' and host community members' strategies for pre- and post-edit MT output; and on which mediation and mitigation strategies are used when optimal communication is not achieved. It is also important to understand the use and usefulness of translation technologies, such as translation memories or terminology management systems, for the translation of migration-related content by informal and sporadic translators and institutional agents. Furthermore, there is a need for empirical

studies that examine the accessibility, equal access, ethics, and sustainability of the use of translation technologies in migratory contexts.

All research has limitations. In our case, a limitation that is particularly worth noting is that the literature review was restricted to published research outputs. Since translation technologies are evolving at a bewildering speed, and the same is true of their deployment in different migration settings, much dedicated research is currently underway and has not yet reached publication stage. Our findings should be viewed as a snapshot in time, as new research is fast emerging. To ensure that readers do not miss out on key developments, we suggest they pay particular attention to work by researchers who are currently exploring the use of translation technologies by people who do not identify themselves as translators; and to work by those who look at how host institutions deploy translation technologies to communicate with migrant communities. Some of the most active representatives of these two overlapping groups include Anthony Pym, David Orrego-Carmona, Lucas Nunes Vieira, Lynne Bowker, Mary Nurminen and Sharon O'Brien.

There are clearly more blind spots and questions to be asked than certainties and answers offered in research to date. Some pressing questions that may be worth including in our collective research agenda are outlined below.

Questions guiding context-oriented research

In which public and private spaces are migrant and host individuals using particular translation technologies to enable communication? What is the geographic spread of this use? (It appears to be a global phenomenon, but it might be possible to identify certain patterns pertaining to specific locations or regions.) When did a given translation technology start being used in a particular migrant setting? What is the periodicity and chronology of this use in specific communities, countries or institutions? (Local, regional, national and global histories of the use of translation technologies in migrant settings are still lacking. Without these histories, we cannot fully understand current developments and prepare for the future.) In which migrant settings is the use of translation technologies planned, managed, evaluated and taught? (The focus here should be on financial, institutional, political, social and other external aspects that inform and influence the uses of these technologies in migrant settings; and on how the deployment of translation technologies impacts the host communities, for instance in terms of border verification and checks, or how speech-to-text and speech-to-speech translation technologies influence security assessments.)

Questions guiding participant-oriented research

The focus here is on the different stakeholders of translation technologies in migrant situations: individual migrants and their communities, members of the host communities and their institutions, translation trainers, translators, tech developers, policymakers, among others. For instance, who in specific migrant and host communities uses translation technologies? Who does not? Who decides on this use in particular contexts? By whom is this use controlled, monitored or evaluated, and taught? Who is ethically and legally responsible for problems that arise due to the incorrect use of MT technologies? What are translation researchers' and trainers' responsibilities vis-a-vis migrant and host communities? How about the responsibility of technology developers? Studies guided by these questions will provide further insights into these stakeholders' expectations, experiences and accountability.

Questions guiding process-oriented research

Research in this strand aims to understand the behaviour, expertise, competences and mental processes that guide the use of translation technologies in migrant settings. Possible questions include: which translation technologies are used in particular settings and how? (E.g., in visa information gathering, during security and border verification and checks, in visa application

lodgement e-platforms, in asylum claims, in job searches and the labour market, in parent-teacher meetings and school exams). With what frequency, purpose and effect? What are the norms related to the use of these technologies within migration contexts? Which aspects are formulated as explicit dos and don'ts, and which are only internalised by users? What do migrants and host communities (not) know about translation technologies? What are their challenges and possible solutions in relation to these technologies? To what extent are they aware that, in some instances, they are being fed raw machine-translation outputs and not original or post-edited versions? To what extent do these communities prefer some technologies over others? To what extent do migrant and host communities prefer alternative, less technology-centred mediation strategies? Which competencies do they need to develop to acquire translation technology literacy for particular scenarios?

Questions guiding product-oriented research

The focus here should be on texts that are generated in migrant settings with the use of translation technology. For instance: in a given communication context (say, asylum claims, doctor-patient consultations, parent-teacher meetings), and for specific language pairs, what are the general characteristics and the quality of translations that migrant individuals generate using specific translation technologies? To what extent does this quality meet the users' communication needs?

Once we have more knowns and fewer unknowns, we will be in a better position to design and facilitate training on MT literacy customised for migrant users in particular contexts. We will also be able to provide organisations working with migrants and policymakers with reliable, research-informed recommendations on how to best use translation technologies in order to mitigate the risk of miscommunication, meet migrants' language needs and, eventually, make societies more inclusive by ensuring that everyone has timely access to relevant information, no matter the language they speak.

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