The Symbiotic Match of AVT & Tech Industry
State-Of-The-Art and Way Forward

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Abstract

The Audiovisual Translation (AVT) sector and the Tech industry have been inseparable, a symbiotic match. In the AVT field, the introduction of the DVD in 1995 was the most significant development in the field of AVT, profoundly influencing the nature of professional practices. It had «repercussions not only in the way audiovisual programmes started to be packaged, marketed and consumed, but also from a quantitative perspective» (Díaz-Cintas 2013: 119). Yet, the greatest catalyst of changes in communications and AVT has always been the Internet (Díaz-Cintas 2013: 119).
In the last decade, the world around us has radically altered. On a daily basis, we are immersed in an audiovisual reality, surrounded by Video Streaming on Demand (SVoD) systems, where players like Netflix spend billions of dollars in new productions reaching volumes of content that were impossible only a decade ago. New experiments with advanced technologies applied to AVT have been consistently carried out since 2000 to meet the demands of SVoD systems: automatic speech recognition (ASR) able to 'understand' the voices in a dialogue, and neural machine translation (NMT) processes have been applied to the production of subtitled versions of films and TV shows to a large extent, generating new roles in the industry and creating new debates about the ethics of technology in the AVT industry.

Key Words – Audiovisual Translation; internet; subtitling; Translation Technologies; Video Streaming on Demand

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1. Introduction

The Audiovisual Translation (AVT) and Tech industries have been inseparable, a symbiotic match. In the AVT field, the introduction of the DVD in 1995 was the most significant development, profoundly influencing the nature of professional practices. It had «repercussions not only in the way audiovisual programmes started to be packaged, marketed and consumed, but also from a quantitative perspective» (Díaz-Cintas 2013: 119).

Since then, the first subtitling editors were developed, desktop software programmes to be installed on a device, able to accommodate video encoding along with text editing and formatting within the same working environment. Yet, the greatest «catalyst of changes in audiovisual communication (and translation) has been, and continues to be, the internet» (Díaz-Cintas 2013: 120). The Web 2.0, or the new interactive version of the Internet generated in the new millennium, has democratized access to advanced technologies allowing the creation of freeware versions of subtitling editors, making them accessible to the general public.

In the last decade, the shift from desktop-based to cloud-based environments, integrating professional functionalities able to process the spotting and translation aspects of subtitling to the highest standards, has been smooth and well-received by Languages Server Providers (LSPs) and professionals working in the global AVT industry. The technological implications of all developments AVT has undergone in time, have also profoundly altered our perception of the audiovisual world and our relationship to it, as simple users, academics, and professional translators, and subtitlers as well.

Meanwhile the world around us has radically altered as well. On a daily basis, we are literally immersed in an audiovisual reality: accompanied by our multipurpose smartphone that let us make an intercontinental Zoom call on our way to work early in the morning, surrounded by Over-the-Top systems (OTT), Video Streaming on Demand (SVoD), where big players like Netflix, Amazon, and Disney+ spend billions of dollars in new productions reaching a volume of content that was absolutely impossible only a decade ago.

In 2020, the Covid-19 pandemic has further increased the demand for internet connectivity, video accessibility, and audiovisual content for entertainment purposes which has reinforced the dominant role of streaming giants that are currently diversifying their offer in multiple source languages in an AVT market that is striving to meet the needs of a global audience. To this end, recent experiments with new technologies applied to AVT (subtitling, dubbing, and accessibility services) have been consistently carried out since the start of the new millennium.

Cloud-based environments have been the perfect stage (Díaz-Cintas and Massidda 2020) for all sorts of test and trials towards the integration of advanced technologies: automatic speech recognition (ASR) systems able to 'understand' the voices in a dialogue and transcribe it with ever-increasing successful rates; translation memories (TMs) once mainly used by the translation industry, have now made their way into cloud-based software for subtitlers; neural machine translation (NMT) engines have been applied to the production of subtitled versions of films and TV shows to a large extent, generating new roles in the AVT industry and creating intense debates regarding the ethics of technology and the agency of professionals in the media localization industry.

In this paper we will find out how these technologies are currently supporting the challenges brought about by the boom of SVoD. We will look into the rise of subtitling to understand if it is going to generate fair working conditions for professionals. Most importantly, we will attempt to identify the trajectory taken by the media localization industry.

2. The new mediascape

The technical and business development of Web 2.0 (DiNucci 1999) has revolutionized the mediascape as we once knew it, by encouraging a progressive democratization of media production on a global scale (Massidda 2015). Against this backdrop, AI technologies generated by Web 2.0 have gradually changed traditional media localization processes, challenging the notion of «high quality as consumers preferences seem to have shifted towards immediacy, greater interactivity, and lower costs» (Díaz Cintas and Massidda 2020: 265).

The rapid growth of audiovisual content, due to the advent and popularity of streaming platforms, has generated the so-called 'rise of subtitling', a phenomenon that many scholars have addressed since its inception (Díaz Cintas and Anderman 2008; Perez and Jánošíková 2018; Massidda, forthcoming). Subsequently, LSPs have worked towards the optimisation of media localization workflows by testing various degrees of automation: AI-powered technologies such as automatic speech recognition (ASR), neural machine translation (NMT), and translation memories (MTs). These various technologies have been integrated into decentralised, cloud-based localisation workflows.

In 2020, the outbreak of the Covid-19 pandemic further increased the pace of these transformation: the habits of international viewers, forced into strict measures of confinement by governments around the world to meet the needs of the global emergency, have changed profoundly, speeding up a process that was already in motion (Massidda, forthcoming). According to Shevenock (2022), the pandemic forced SVoD systems to broadcast older TV programs in new markets and languages due to the shutting of cinemas, thus leading to a growth in the demand for content localization across the globe. Since the inception of the rise of subtitling, LSPs worldwide have struggled to meet the needs of a shifting mediascape by introducing new technologies and implementing global pools of professionals in the AVT sector plugged into proprietary cloud-based environments in order to improve efficiency, timing and reduce costs. 'Cloud subtitling' is a localisation trend that defines a workflow conducted online through the collaboration of professional subtitlers based in different geographical locations around the world (Díaz Cintas and Massidda 2020; Bolaños-García-Escribano et al. 2021).

Streaming services have utterly transformed the mediascape before our eyes. The streaming sector is currently in bloom and continues to boom with a total global subscribers increase of 100,000 from 2020 to reach 1.3 billion in 2021 (Glenday 2022). The expected post-pandemic tail off in number of subscribers (see Table 1) shows no sign of materializing in the latest figures compiled by the Motion Picture Association. This insatiable demand for entertainment has manifested into 950 US films produced in 2021 with 111% increase in 2020; 1,826 original series released in 2021 with 15% increase from 2020. Streaming platforms have produced 179 original films released to their platforms in 2021 (Glenday 2022). Streaming success story is now matched by a resurgent theatrical and home entertainment market which has now surpassed pre-pandemic condition with revenues of $99.7bn in 2021 (Glenday 2022).

GLOBAL SUBSCRIBERS	
Netflix	221 M
Amazon Prime Video	200 M
Disney Plus	138 M
HBO Max	77 M
Hulu	46 M

Table 1 – Ampere Analysis 2021

The biggest players in the media broadcasting industry operate in multiple markets, in dozens of languages, and with an expectation that all new content is released 'day and date', that is, immediately after their release (Massidda, forthcoming) into every market at the same time everywhere in the world. These developments are inevitably having a huge impact on the media and entertainment business in the way the media localization of such high volume of content (whether it is done via subtitling, dubbing, or voiceover) in extremely tight turnaround times is performed.

Netflix has recently launched the Rome Hub as a long-term commitment to Italy and its creative community. The new base will house 70 members of staff devoted to the production of original series and films in Italy, such as *Robbing Mussolini*, adding to other EU Netflix bases: UK, France, Spain, and Poland, among others (Whittock and Goldbart 2022). Yet, meanwhile, other players are upping their game: while Disney Plus was recently launched in South Africa with «unprecedented access to Disney's vault, beloved classics such as *Cinderella*, *The Princess and the Frog*, and *The Little Mermaid*, will be available to stream alongside recent blockbusters»[1]. Furthermore, HBO Max expands to Central, Eastern Europe and other regions of the world (Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Moldova, Montenegro, Netherlands, North Macedonia, Poland, Portugal, Romania, Serbia, Slovakia, and Slovenia) reaching sixty-one countries globally[2].

2.1 Fansubbing in the age of streaming

The new trends brought about by the SVOD boom have greatly improved access to content in the last few years. However, they have also «facilitated piracy, creating trade-offs for content producers and distributors» (Nolan et al., forthcoming).

Advances in streaming technologies have transformed the mediascape and aggrandized its potential profoundly affecting another field of Translation Studies that has been referred to as «non-professional subtitling» (Lee and Orrego-Carmona 2017; Magazzù 2018), «participatory fan culture» (Jenkins et al. 2009; Lee 2011), and «fansubbing» (Díaz-Cintas and Muñoz Sánchez 2006; Massidda 2015) to name but a few terminologies used in association with the phenomenon. In the second decade of the new century, the nature of participatory fan culture has changed accordingly: once a necessary evil able to make foreign products accessible in the local language, fansubbing practices, as of now, have no raison d'être anymore (Massidda 2020) due to the global media localization processes.

Fansubbing, a term coined in the 1980s to describe the activity of fans producing fansubs for fellow fans, began in association with anime subculture (O'Hagan 2009), whereas, in the new millennium, the second wave of fansubbing (Massidda 2019) flourished thanks to the golden age of TV shows (Pichard 2011). The second phase of the non-professional subtitling phenomenon caused «the proliferation of numerous sets of fansubbing machines in each specific territory, as described by Fan, Media and Translation Studies around the world» (Massidda 2020: 2). Since its inception, participatory fan culture's intervention in the media and entertainment industry has witness the creation of community-based groups located in a plethora of regions all around the world, as confirmed by the works published on the topic.

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[1] The Guardian, <https://guardian.ng/apo-press-releases/disney-arrives-today-in-south-africa/> (accessed 10/12/2022).

[2] Broadband TV News, <https://www.broadbandtvnews.com/2022/03/08/hbo-max-expands-to-central-and-eastern-europe> (accessed 10/12/2022).

In Europe, various forms of fansubbing practices have been analysed in Belgium (Verbruggen 2010), Croatia (Čemerin and Toth 2017), Czech Republic and Poland (Bogucki 2009; Svelch 2013; Łuczaj and Holy-Łuczaj 2014, 2017), France (Dagiral and Tessier 2008; Bréan 2014; Paquienseguy 2016), Greece (Karagiannidis 2014), Italy, (Barra 2009; Barra e Guarnaccia 2009; Beseghi 2016; Casarini and Massidda 2017; Lepre 2015; Magazzù 2018; Massidda 2012; 2013, 2015, 2019; Vellar 2011; Bruti and Zanotti 2016), Poland (Sajna 2013; Mika 2015), Portugal (De Souza 2016), the Netherlands (Lam 2017), Romania (Dwyer and Uricaru 2009), Spain (Fernández Costales 2012; Bolaños-García-Escribano 2017), and Sweden (Hemmungs Wirtén 2012; Pedersen 2019). Outside Europe, non-professional subtitling practices have been investigated in Argentina, Brazil, China, Jordan and Lebanon, Japan, South, Thailand, and Turkey. However, many other regions not part of academic studies may have been involved in the phenomenon. Since 2009, fansubbing communities around the world have faced a series of legal actions (Massidda 2020) aimed at halting illegal activities and copyright infringement and protecting the broadcasting industry. As a result, many websites, particularly in Europe (e.g., Italy, Norway, Sweden) were shut down making it illegal to produce and distribute fansubs.

Yet, in the past decade, the proliferation of streaming platforms has produced an inverse reaction: while households cannot afford multiple SVoD subscriptions, many users are turning to fansubs, piracy, and illegal streaming. According to Nolan et al., (forthcoming), open-source platforms such as Kodi, «facilitate both legal and unlicensed access to content from OTT subscription services». Overall, it seems that the issue of copyright infringement is yet to be solved, and more research is needed to explore the phenomenon in more depth.

2.2 Global streamers and the evolution of localization strategies

By looking at these data and the revenues of the leading global players in today's mediascape, a clear picture emerges about the dynamics at play in the global market: North America, Western Europe, Asia Pacific and Central, and South America are the main areas of growth, while streaming systems are currently launching in new regions of the world, such as Africa and the Middle East region[3]. Following Ampere Analysis reports 2021, North America has now turned into a saturated market, therefore Netflix and other streamers are strategically turning to different regions to reach out to new audiences and increase their subscribers. Within these strategies aimed at expanding in new markets, we can define clear cut stages in the overall process, especially as far as Netflix is concerned.

First of all, the strategy put in place by the streaming giant is to launch in the new market with the existing catalogue, no localized version of the titles is curated before the launch; only subsequently the company invests into media localization projects locally (via subtitling or dubbing) in an effort to adapt the catalogue to the local audience. The second stage is focused on the acquisition of third party local content to cater for the needs of local audiences. If the process goes well in terms of engagement and subscription numbers, the third phase begins with the commissioning of local content, such as movies, for example, and concludes with longer series and longer formats to retain the subscriber base in the long run, which nonetheless represents a relatively low share.

In their 2021 report, Ampere Analysis confirms that Amazon Prime Video and Netflix tend to localize the majority of their catalogue, roughly 80% on average, and their titles are either subtitled or dubbed, or both. Depending on the market, some differences can be retrieved in the media localization process, and some markets are at a different stage of this broader process. As for English speaking markets, the majority of titles are offered

[3] Ampere Analysis Reports 2021, <https://www.ampereanalysis.com/reports> (accessed 10 December 2022).

with their subtitled versions, whereas in the major European markets, while subtitling represents the bulk of localized content, dubbing has a much higher rate. This is due to local preferences, the size of the market, and, most importantly, the ubiquity of the language itself.

Overall, the consumer preferences regarding either dubbing or subtitling are varied at a global scale. Following Ampere Analysis report 2021, we can distinguish three groups of countries. The first is represented by anglophone markets where most of the consumers do not particularly enjoy either subtitled or dubbed content. The second group is represented by Western European key markets, such as Germany, Italy, France, and Spain, with strong dubbing preferences, who enjoy dubbed content but not so much subtitling. A third group of countries sees Saudi Arabia, Mexico, Turkey and India, markets with a strong preference for both dubbed and subtitled contents, being regions where the majority of the population has a relatively good understanding of the English Language, as this forms the majority of the catalogue.

3. State of the art of subtitling technologies

The optimisation of professional functionalities of most subtitling software programs has seen an incredibly fast pace in recent times. Language service providers and media localization vendors have been investigating the potentials offered by AI-powered technologies aiming to keep up with the higher demand posed by streaming solutions in terms of content and faster turnarounds. Tech companies and subtitling vendors have developed new procedures able to perform a large variety of tasks within the same working environment.

A plethora of translation technologies such as terminology databases, translation memory systems, and electronic workbenches «are also starting to be widely used in AVT, thus contributing to more efficient workflows and propitiating faster terminological searches and more consistent translations by re-using projects previously accomplished and stored in such tools» (Bolaños-García-Escribano and Díaz-Cintas 2020). These functionalities, able to enhance the accuracy of subtitle synchronization and subtitling translation, are plentiful and varied: the audiowave form bar able to visualize the sound of voices and music; audio scrubbing functionalities able to play the video frame by frame; automatic backup of progress; automatic quality check; subtitle file format conversion; horizontal and vertical typing; shot change auto-detection, just to name a few. Overall, these new functionalities integrated in commercial subtitling editors are meant to speed up processes, boost subtitlers productivity, and achieve high levels of accuracy and consistency. However, the most interesting innovation has been the integration of AI-powered technologies into media localization workflows: Artificial Intelligence (AI), Machine Learning (ML), and cloud computing are key technology drivers for closed captioning, subtitling, and also dubbing.

In the last few years, the consumption of video streaming services has risen exponentially consequently forcing LSPs to find new strategies to adapt to the new mediascape's demands. To this end, new applications have been developed in the field of speech technologies having a visible impact on the AVT sector. The need to transcribe film dialogues automatically has become more crucial than ever before: automatic speech recognition (ASR) technology has known an incredible progress in converting oral speech into text. Once post-edited by professionals, the output of this process is then used to produce English Master Templates (EMT), that is, intralingual subtitle files of a programme along with their timecodes, to be employed in projects in multiple languages (Ciobanu and Secară 2020). When EMTs started to be integrated in subtitling workflows

(Georgakopoulou 2006), online, decentralized workflows began to take shape, streamlining the process. The use of EMTs, in the media localization sector on the part of LSPs, is a common practice nowadays (Kapsaskis 2011; Nikolić 2018; Georgakopoulou 2006) as they are able to simplify the whole process. One single file is distributed to the professionals working in multiple language pairs that will produce the subtitles without the need to take care of the technical dimension of subtitling. Furthermore, the quality control (QC) process will be smoother, in turn lowering overall costs: «template files became the cornerstone for the globalisation of the subtitling industry» (Georgakopoulou 2019: 1).

Machine translation (MT) systems have been the object of a decade of experimental studies in the audiovisual translation field and interlingual subtitling in particular: «computational linguists, recognizing the potential of new technologies to escalate productivity, have explored the interaction between machine translation (MT) and interlingual subtitling» (Díaz Cintas and Massidda 2020: 261). The MT engines applied to media localization workflows nowadays are the result of years of experiments: the systems employed in the AVT and translation industry are founded on deep learning in neural networks and are known as (NMT systems, advanced AI-powered machines able to produce extremely good results. One of the first and pioneering studies exploring automated subtitles is SUMAT[4] (2011-2014) in which a group of subtitling companies along with some academics employed cloud-based statistical machine translation (SMT) engines to produce the translation of subtitles in seven bi- directional language pairs (Bywood et al. 2017).

Numerous scholars in the AVT field have examined the application of NMT systems to interlingual subtitling focusing on the quality of the final output, and the delicate issue and ethics of post-editing (Nyberg and Mitamura 1997; Popowich et al. 2000; Melero et al. 2006; Armstrong et al. 2006; De Sousa et al. 2011; Sawaf 2012; Athanasiadi 2017; Massidda and Sandrelli, forthcoming), an aspect of AI-powered technologies that has triggered delicate debates on the agency and freedom of subtitlers and the sustainability of the AVT sector in general.

In the past few months Netflix broadcasted *Squid Game,* the most watched TV series of all time able to reach over 1.6 billion viewing hours (Shevenock 2022). This popular TV programme sparked a controversy among professionals in the AVT sector due to the mistakes found in the subtitles provided by the streaming giant (Groskop 2021). According to the organisation representing Spanish audiovisual translators (ATRAE[5]), Netflix's vendors allegedly employed machine translation technologies to subtitle *Squid Game*. Spanish subtitlers belonging to the organisation lament that post-editing neural machine translation systems (MTPE) promote precariousness in the profession. As a result, in 2021, AVTE[6], the European Federation of National Associations for Media Translators, published the *Machine Translation Manifesto*[7], a report with a set of recommendations and guidelines for the application of AI-powered human translation to the AVT sphere as a way to promote better working conditions for professionals.

3.1 The future of subtitling is in the cloud

Cloud computing has revolutionized the world around us by developing applications that reside on a virtual space between devices able to store humongous amount of data.

[4] SUMAT, Subtitling by Machine Translation, <https://cordis.europa.eu/project/rcn/191741_en.html> (accessed 10 December 2022).
[5] ATRAE, <https://atrae.org/> (accessed 10 December 2022).
[6] AVTEUROPE, <avteurope.eu> (accessed 10 December 2022).
[7] <avteurope.eu/avte-machine-translation-manifesto/> (accessed 10 December 2022).

Whatever device (e.g., laptop, PC, smartphone, tablet) can be plugged into the cloud from anywhere and everywhere, allowing users to share and store files on applications such as Dropbox and Google Drive, or watch videos on streaming platforms such as Disney Plus and Netflix. However, the greatest accomplishment of this powerful technology is the possibility of computerizing the Web 2.0 by moving away from desktop-based software programs to cloud-based applications. In the field of AVT, web-based subtitling toolkits progressively turned media localization workflows into the decentralized ecosystems we use today:

> the AVT profession is witnessing profound changes due to the very nature of the technology-driven modus operandi in place, which is increasingly being articulated around a global pool of localization teams connected to proprietary cloud-based platforms, with the ultimate goal of improving speed, efficiency and scalability. In this agile environment, subtitling has been the preferred translation mode chosen by most developers to test the new waters (Díaz-Cintas and Massidda 2020: 265).

Audiovisual translation practices in the media localization industry pose a variety of linguistic and technical constraints for professionals working in the AVT field: they are required to master the use of specific applications and software programs to overcome such technical specifications (Bolaños-García-Escribano and Díaz-Cintas 2020). The pioneering transformation in audiovisual productions have brought about a set of supplementary challenges, such as the tight turnaround times due to 'day and date' releases for which stakeholders are expected to speed up localization processes and deliver projects in the fast lane. To address this new reality, the media industry has swiftly embraced cloud computing technologies which have been able to alter traditional workflows and processes improving teamwork as they allow multiple users to work on the same project simultaneously (Díaz-Cintas and Massidda 2020).

In the new millennium, the interest of LSPs in the potential of cloud computing applied to subtitling soon became clear: ZOO Digital[8] launched the very first web-based application for subtitling, ZOOsubs, in 2009. Since then, a broad range of cloud-based subtitling ecosystems have been developed by tech and media companies in the world. These proprietary systems are meant to be used by the employees of the company only and are not available to externals, such as IYuno SDI's iMediaTrans[9], Nordisk Undertext's Plint[10], and Netflix's Subtitle Originator, which represents «a central hub for project managers, translators, and vendors that also includes a subtitling environment, similar to a translation environment with added features[11]».

In other instances, these cloud-based toolkits can be available on demand to general users, for example eCaption[12] and Ooona[13], a user-friendly ecosystem for subtitling training used in various translation courses in higher education institutions allowing students to practice on the same technology employed by the media localization industry.

Some of these platforms offer a high level of automation through the integration of AI-powered technologies. CaptionHub[14], for example, manages the linguistic transfer processes with the use of specialist CAT tools such as translation memory (TM) systems able to retrieve previously saved chunks of translations to speed up and optimize the

[8] ZooSubs, <www.zoosubs.com> (accessed 10 December 2022).
[9] IMediaTrans, <www.imediatrans.com> (accessed 10 December 2022).
[10] Plint, <www.undertext.se/plint> (accessed 10 December 2022).
[11] Slator, <https://slator.com/how-netflix-does-subtitling-for-the-world-ex-china/> (accessed 10 December 2022).
[12] ECaption, <www.ecaption.eu> (accessed 10 December 2022).
[13] OOONA, <https://ooona.ooonatools> (accessed 10 December 2022).
[14] Caption Hub, <https://captionhub.com> (accessed 10 December 2022).

workflow. CaptionHub also incorporates ASR engines for transcribing the film dialogue, built-in machine learning (ML) algorithms able to automatically synchronize the subtitles (auto-caption tool) and state-of-the-art NMT for a post-editing focused media localization workflow. Overall, the field of cloud computing technologies applied to audiovisual translation is currently witnessing increasing success on the part of tech and media industries. Further developments are under way as we speak, and we can expect new integrations of advanced technologies in the near future.

4. Conclusions

In a world that is constantly changing as far as new technologies are concerned, and that is witnessing an unprecedented audiovisualization that permeates our lives on the clock, audiovisual translation is experiencing the same epochal transformations as a way to adapt to a new globalized world and a new mediascape surrounding us. Traditional AVT workflows characterized by in-person communications (e.g., in-house positions for subtitlers) and slower turnaround times, have been replaced by remote interconnections, freelance based contracts, and activities carried out in a decentralized way (remotely), by employing advanced technologies able to embrace automation as much possible.

Some of the technological developments applied to audiovisual translation described in this paper have utterly changed traditional roles and tasks of professionals as well. Traditional subtitlers, once able to own the linguistic and technical dimension of the subtitling profession, are now asked to adapt to the new digital era and interact with AI-powered applications able to produce automatic translations and post-edit the output generated by a NMT in a new role, the 'post-editor', or to verify the quality of a translation within an automated QC process integrated in a cloud-based platform, for example. These are only a few instances of the new tasks available that are part and parcel of the media localization processes nowadays.

The advantages and disadvantages of new developments in the digital age, from a professional perspective, have been discussed widely by many scholars (O'Hagan 2003; Baños 2018; Moorkens 2017, 2020; do Carmo 2020; Massidda and Sandrelli, forthcoming). While for some professionals these transformations represent a real threat leading to deprofessionalization, for others these new AI-powered workflows might open up the profession and boost the provision of more accessible and translated, whether subtitled or dubbed, audiovisual content.

According to AVTE, tech companies and LSPs have prioritised efficiency to the point that «outputs must be quantified, and workers continually audited» (Parenti 2001: 12). In 2021, AVTE published the Machine Translation Manifesto[15], an executive summary with suggestions and recommendations for AI-powered human translation in the media localization industry. The main aim of the Machine Translation Manifesto is to promote best practices for the long-term sustainability of the translation and entertainment industries in general, and the subtitling profession in particular. The intrinsic value of translation as a professional activity (do Carmo 2020) is a matter that will require further consideration in the future, especially in the context of human-machine interaction and the ethics of audiovisual translation technologies.

Lately, a series of initiatives have been launched as a way to provide a solution to the precarious situation threatening the subtitling profession: Zoo Digital recently launched Zoo Academy[16] providing its contribution to the training of future generations; similarly,

[15] AVTEUROPE, <avteurope.eu/avte-machine-translation-manifesto/> (accessed 10 January 2023).
[16] Zoo Digital, <https://www.zoodigital.com/about/zoo-academy/> (accessed 10 December 2022).

Plint[17] has created a programme that will enable the company to retain talent. On the academic front, the AVT Pro Certification[18] is a research project aimed at acknowledging the expertise of professional subtitlers by creating the first international subtitling certification in the world. Furthermore, the impact that the streaming industry system has had on the media localization market, with its ever-growing demand for translation services at a global scale, compelling LSPs to find strategies able to manage the time pressure it has imposed (Díaz Cintas and Massidda 2020), is still mostly under researched. Overall, flexibility and adaptation will be the most crucial factors able to face the new challenges posed by innovation in the new millennium.

Bibliography

Armstrong, Stephen; Way, Andy; Caffrey, Colm; Flanagan, Marian; Kenny, Dorothy; O'Hagan, Minako (2006), 'Improving the Quality of Automated DVD Subtitles Via Example-Based Machine Translation', in *Proceedings of Translating and the Computer*, vol. 28, London, Aslib, 1-13, <www.mt- archive.info/ Aslib- 2006- Armstrong.pdf> (accessed 10 December 2022).

Athanasiadi, Raffaella (2017), 'Exploring the potential of machine translation and other language assistive tools in subtitling: A new era?', in Deckert, Mikołai (ed.) *Audiovisual Translation: Research and Use*, Berlin-Bern-Bruxelles-New York-Oxford-Warszawa-Wien, Peter Lang, 29-50.

Baños, Rocío (2018), 'Technology and audiovisual translation', in Chan, Sin-wai (ed.), *An Encyclopaedia of Practical Translation and Interpreting*, Hong Kong, The Chinese University of Hong Kong Press, 15-41.

Barra, Luca (2009), 'The mediation is the Message: Italian Regionalization of US TV Series as Co-creational Work', *International Journal of Cultural Studies* 12, 509-525.

Barra, Luca; Guarnaccia, Fabio (2009), 'Un lavoro di squadra. Processi produttivi e organizzazione gerarchica dei fansubber', *Link. Idee per la televisione* 6, 233-241.

Beseghi, Micòl (2016), 'WTF! Taboo Language in TV Series: An Analysis of Professional and Amateur Translation', *Altre Modernità. Rivista di studi letterari e culturali* 15, 215-231.

Bolaños-García-Escribano, Alejandro (2017), 'The Effects of Fansubs on EFL Education For Translation and Interpreting Students: An Empirical Approach', *Journal of Specialised Translation* 28, 122-163.

Bolaños-García-Escribano, Alejandro; Díaz-Cintas, Jorge (2020), 'The Cloud Turn in Audiovisual Translation', in Bogucki, Łukasz; Deckert, Mikołai (eds.), *The Palgrave Handbook of Audiovisual Translation and Media Accessibility*, Cham, Palgrave Macmillan, 519-544.

Bolaños-García-Escribano, Alejandro; Díaz-Cintas, Jorge; Massidda, Serenella (2021), 'Subtitlers on the Cloud: The Use of Professional Web-based Systems in Subtitling Practice and Training', *Revista Tradumàtica. Tecnologies de la Traducció* 19, 1-21.

Bogucki, Łukasz (2009), 'Amateur Subtitling on The Internet', in Díaz Cintas, Jorge; Anderman, Gunilla (eds.), *Audiovisual Translation: Language Transfer on Screen*. London, Palgrave Macmillan, 49-57.

Bréan, Samuel (2014), 'Amateurisme et sous-titrage: la fortune critique du "fansubbing"', *Traduire* 230, 22-36, <https://journals.openedition.org/traduire/618> (accessed 10 December 2022).

[17] Plint, <https://plint.com/> (accessed 10 December 2022).
[18] The POOOL, <https://the-poool.com/certification/> (accessed 10 December 2022).

Bruti, Silvia; Zanotti, Serenella (2016), 'Fansubbing in Close-Up: A Study of Interjections and Discourse Markers', in Antonini, Rachele; Bucaria, Chiara (eds.), *Non-Professional Interpreting and Translation in the Media*, Bern, Peter Lang, 231-256.

Bywood, Lindsay; Georgakopoulou, Panayota; Etchegoyhen, Thierry (2017), "Embracing the threat: machine translation as a solution for subtitling', *Perspectives* 25 (3), 492-508.

Casarini, Alice (2015), 'Chorus Lines. Translating Musical TV Series in the Age of Participatory Culture: The case of Glee', in Díaz-Cintas, Jorge; Neves, Josélia (eds.), *Audiovisual Translation: Taking Stock*, Newcastle upon Tyne, Cambridge Scholars Publishing, 209-229.

Casarini, Alice; Massidda Serenella (2017), 'Sub Me Do: The Development of Fansubbing in Traditional Dubbing Countries: The Case of Italy', in Orrego-Carmona, David; Lee, Yvonne (eds.), *Non-Professional Subtitling*, Newcastle, Cambridge Scholars Publishing, 63-86.

Čemerin Dujmić, Vedrana; Toth, Marko (2017), 'An Exploration of Motives for Fansubbing Based on Several Croatian Fansubbing Communities', in Lee, Yvonne; Orrego-Carmona, David (eds.), *Non-Professional Subtitling*, Newcastle, Cambridge Scholars Publishing, 199-234.

Ciobanu, Dragoş; Secară, Alina (2020), 'Speech Recognition and Synthesis Technologies in the Translation Workflow', in O'Hagan, Minako (ed.), *The Routledge Handbook of Translation and Technology*, Abingdon, Routledge, 255-270.

Dagiral, Eric; Tessier, Laurent (2008), '24 heures! Le sous-titrage amateur des nouvelles séries televisées', in Gaudez, Florent (ed.), *Les arts moyens aujourd'hui*, vol. II, Paris, L'Harmattan, 107-123.

De Sousa, Sheila C. M.; Aziz, Wilker; Specia, Lucia (2011), 'Assessing the Post-Editing Effort for Automatic and Semi- Automatic Translations of DVD Subtitles', in *Proceedings of the International Conference Recent Advances in Natural Language Processing*, Hissar, Association for Computational Linguistics, 97-103.

De Souza, Lilian (2015), 'Revisão De Fansubs: Análise Das Práticas De Revisão De Tradução Audiovisual em Legendas não Comerciais Produzidas por Equipes Organizadas',
Cadernos Cespuc De Pesquisa Série Ensaios 26, <http://periodicos.pucminas.br/index.php/cadernoscespuc/article/view/P2358-3231.2015n26p149/9249> (accessed 10 December 2022).

Díaz-Cintas, Jorge (2013), 'The Technology Turn in Subtitling', in Thelen, Marcel; Lewandowska-Tomaszczyk, Barbara (eds.), *Translation and Meaning: Part 9*, *Proceedings of the Maastricht Session of the 5th International Maastricht - Łódź Duo Colloquium on "Translation and Meaning"*, Maastricht, The Netherlands, 19-22 September 2010, Maastricht, Zuyd University of Applied Sciences, 119-132.

Díaz-Cintas, Jorge; Muñoz Sánchez, Pablo (2006), 'Fansubs: Audiovisual Translation in an Amateur Environment', *The Journal of Specialised Translation* 6, 37-52.

Díaz-Cintas, Jorge; Anderman, Gunilla (eds.) (2009), *Audiovisual Translation. Language Transfer on Screen*, Houndmills, Palgrave Macmillan.

Díaz-Cintas, Jorge; Massidda, Serenella (2020), 'Technological Advances in Audiovisual Translation', in O'Hagan, Minako (ed.), *The Routledge Handbook of Translation and Technology*, Abingdon, Routledge, 255-270.

DiNucci, Darcy (1999), 'Fragmented Future', *Print* 32, 220-222, <www.darcyd.com/fragmented_future.pdf> (accessed 10 December 2022).

Do Carmo, Félix (2020). '"Time is Money" and the Value of Translation', in Moorkens, Joss; Kenny, Dorothy; do Carmo, Félix (eds.), *Fair MT. Towards ethical,*

sustainable Machine Translation, Special issue of *Translation Spaces* 9.1, Amsterdam, John Benjamins, 12-34.

Dwyer, Tessa; Uricaru, Ioana (2009), 'Slashings and Subtitles: Romanian Media Piracy, Censorship, and Translation', *The Velvet Light Trap* 63, 45-57, <https://muse.jhu.edu/article/258612/summary> (accessed 10 December 2022).

Fernández Costales, Alberto (2012), 'Collaborative Translation Revisited. Exploring the Rationale and the Motivation for Volunteer Translation', *International Journal of Interpretation and Translation* 10, 115-142.

Georgakopoulou, Panayota (2006), 'Subtitling and Globalisation', *The Journal of Specialised Translation* 6, 115-120, <www.jostrans.org/issue06/art_georgakopoulou.php> (accessed 10 December 2022).

Georgakopoulou, Panayota (2019), 'Template Files: The Holy Grail of Subtitling', *Journal of Audiovisual Translation* 2 (2), 137-160.

Glenday, John (2022), 'Global Streaming Subscriptions Surge 100,000 to 1.3 billion in 2021', *The Drum*, March 15, 2022, <https://www.thedrum.com/news/2022/03/15/global-streaming-subscriptions-surge-100000-13-billion-2021> (accessed 10 December 2022).

Groskop, Viv (2021), 'Lost in translation? The one-inch truth about Netflix's subtitle problem', *The Guardian*, October 14, 2021, <https://www.theguardian.com/tv-and-radio/2021/oct/14/squid-game-netflix-translations-subtitle-problem> (accessed 10 December 2022).

Hemmungs Wirtén, Eva (2013), 'Swedish Fansubbers Call Off Strike! Fan-to-Fan Piracy, Translation, and the Primacy of Authorization', in Hunter, Dan; Lobato, Ramon; Richardson, Megan; Thomas, Julia (eds.), *Amateur Media: Social, Cultural and Legal Perspectives*, London, Routledge, 125-136.

Jenkins, Henry (2009), *Confronting the Challenges of Participatory Culture. Media Education for the 21st Century*, <https://mitpress.mit.edu/9780262513623>.

Kapsaskis, Dionysios (2011), 'Professional Identity and Training of Translators in the Context of Globalisation: The Example of Subtitling', *The Journal of Specialised Translation* 16, 162-184.

Karagiannidi, Panagiota (2014), 'Ο ερασιτεχνικός υποτιτλισμός στην Ελλάδα: Ακολουθούμενες πρακτικές' [Amateur subtitling in Greece: Follow-up Pract]. Bachelor's Thesis, Ionian University, Greece, <https://bit.ly/2crDr6p> (accessed 10 December 2022).

Lam, Chi-Yim (2017), 'Reception of Fansubs vs Professional Subtitles in the Netherlands', Master's Thesis, Leiden University.

Lee, Hye-Kyung (2011), 'Participatory Media Fandom: A Case Study of Anime Fansubbing', *Media, Culture & Society* 33 (8), 1131-1147.

Lee, Yvonne; Orrego-Carmona, Diego (eds.) (2017), *Non-Professional Subtitling*, Cambridge, Cambridge Scholars Publishing.

Lepre, Ornella (2015), 'Cultural References in Fansubs: When Translating is a Job for Amateurs', in Perego, Elisa; Bruti, Silvia (eds.), *Subtitling Today: Shapes and Their Meanings*, Newcastle upon Tyne, Cambridge Scholars Publishing, 257-279.

Łuczaj, Kamil; Holy-Łuczaj, Magdalena (2014), 'The Polish Subtitles Scene in Context of Postmodern Civil Society', in Jarosz, Adam (ed.), *Good Governance and Civil Society*. *Selected Issues on the Relations between State, Economy and Society*, Newcastle upon Tyne, Cambridge Scholars Publishing, 151-170.

Łuczaj, Kamil; Holy-Łuczaj, Magdalena (2017), 'Those Who Help Us Understand Our Favourite Global TV Series in a Local Language - Qualitative Meta-Analysis of Research on Local Fansub Groups', *Babel* 63 (2), 153-173.

Magazzù, Giulia (2018), 'Non-professional Subtitling in Italy: The Challenges of

Translating Humour and Taboo Language', *Hikma. Revista de Traduccion* 17, <www.uco.es/servicios/ucopress/ojs/index.php/hikma/article/view/11103/pdf> (accessed 10 December 2022).

Massidda, Serenella (2013), 'The "Lost" World of fansubbers, the Other Translators', in Cocco, Simona Maria; Dell'Utri, Massimo; Falchi, Simonetta (eds.), *L'altro. I molteplici volti di un'ineludibile presenza*, Roma, Aracne, 193-209.

Massidda, Serenella (2015), *Audiovisual Translation in the Digital Age: The Italian Fansubbing Phenomenon*, Basingstoke, Palgrave Macmillan.

Massidda, Serenella (2020), 'Fansubbing, Latest Trends and Future Prospects', in Bogucki, Łukasz; Deckert, Mikołai (eds.), *The Palgrave Handbook of Audiovisual Translation and Media Accessibility*, Basingstoke: Palgrave Macmillan, 189-208.

Massidda, Serenella (forthcoming), 'Disruptive AVT Workflows in the Age of Streaming the Netflix Equation', in Choi, Jinsil; Evans, Jonathan; Kim, Kyung Hye (eds.), *Audiovisual Translation in the Age of Streaming Target Special Issue*, Vol. 35.

Massidda, Serenella; Sandrelli, Annalisa (forthcoming), '¡Sub! Localisation Workflows (th)at Work', in Díaz-Cintas, Jorge; Rizzo, Alessandra; Zummo, Marianna (eds.), *Translation and Translanguaging in Multilingual Contexts*, Amsterdam, John Benjamins Publishing.

Mika, Bartosz (2015), 'The Polish Amateur Fansubbing Community as an Example of Online Collaboration Project', *Miscellanea Anthropologica et Sociologica* 16 (2), 143-168.

Melero, Maite; Oliver, Antoni; Badia, Toni (2006), 'Automatic Multilingual Subtitling in the eTITLE Project', *Proceedings of Translating and the Computer 28*, London, Aslib, 1-18, <www.mt- archive.info/ Aslib- 2006- Melero.pdf> (accessed 10 December 2022).

Moorkens, Joss (2017), 'Under Pressure: Translation in Times of Austerity', *Perspectives. Studies in Translation Theory and Practice* 25 (3), 464-477.

Moorkens, Joss (2020), '"A Tiny Cog in a Large Machine". Digital Taylorism in The Translation Industry', *Translation Spaces* 9 (1), 12-34.

Nyberg, Eric; Mitamura, Teruko (1997), 'A real- time MT system for translating broadcast captions', in *Proceedings of the Sixth Machine Translation Summit*, San Diego, USA, October 29-November 1997, 51-57, <www.lti.cs.cmu.edu/ Research/ Kant/ PDF/ mts6.pdf> (accessed 10 December 2022).

Nikolić, Kristijan (2018), 'The Pros and Cons of Using Templates in Subtitling', in Díaz Cintas, Jorge; Baños Piñero, Rocío (eds.), *Audiovisual Translation in a Global Context: Mapping an Ever-Changing Landscape*, New York, Palgrave Macmillan, 192-202.

Nolan, Zachary; Williams, Jonathan W.; Zhang, Haoran (forthcoming), 'The Impact of Video Piracy on Content Producers and Distributors', <https://jonwms.web.unc.edu/> (accessed 10 December 2022).

O'Hagan, Minako (2003), 'Can language technology respond to the subtitler's dilemma? A preliminary study', in *Translating and the Computer 25*, London, Aslib, 1-18, <https://aclanthology.org/2003.tc-1.4.pdf> (accessed 10 December 2022).

Parenti, Christian (2001). 'Big Brother's Corporate Cousin', *The Nation*. 27 July 2001, <www.thenation.com/article/archive/big-brothers-corporate-cousin> (accessed 10 December 2022).

Paquienséguy, Françoise (2016), 'Pratiques d'écran brouillées: le fansub d'anime en France', in Châteaucert Jean; Delavaud, Gilles (eds.), *D'un écran à l'autre, les mutations du spectateur*, Paris, Ina-L'Harmattan, 1-9.

Pedersen, Jan (2019), 'Fansubbing in Subtitling Land. An Investigation into the Nature of Fansubs in Sweden', *Target* 31 (1), 50-76.

Perez, Emília; Jánošíková, Zuzana (2018), 'The Rise of Subtitling in Dubbing Slovakia', *Translatologia Journal* 2 (1), 23-32.

Pichard, Alexis (2011), *Le Nouvel Age d'or des séries américaines*, Paris, Editions Le Manuscrit.

Popowich, Fred; McFetridge, Paul; Turcato, Davide; Toole, Janine (2000), 'Machine Translation of Closed Captions', *Machine Translation* 15 (4), 311-341.

Sajna, Mateusz (2013), 'Amateur Subtitling: Selected Problems and Solutions', in Bilić, Viktorija; Holderbaum, Anja; Kimmes, Anne; Kornelius, Joachim; Stewart, John; Stoll, Christoph (eds.) *T21N-Translation in Transition* 3, 1-17.

Sawaf, Hassan (2012), 'Automatic Speech Recognition and Hybrid Machine Translation For High-Quality Closed-Captioning and Subtitling for Video Broadcast', in *Proceedings of Association for Machine Translation in the Americas* – AMTA 14, 1-5, <https://aclanthology.org/2012.amta-commercial.15.pdf> (accessed 10 December 2022).

Shevenock, Sarah (2022), 'The International Content Boom Has Made Subtitlers and Dubbers the Lifeblood of Streaming', *Morning Consult.* April 25, 2022, <https://morningconsult.com/2022/04/25/subtitles-dubbing-streaming> (accessed 10 December 2022).

Švelch, Jaroslav (2013), 'The Delicate Art of Criticizing a Saviour: "Silent Gratitude" and the Limits of Participation in the Evaluation of Fan Translation', *Convergence* 19 (3), 303-310.

Vellar, Agnese (2011), '"Lost" (and Found) in Transculturation. The Italian Networked Collectivism of US TV Series and Fansubbing Performances', in Colombo, Fausto; Fortunati, Leopoldina (eds.), *Broadband Society and Generational Changes*, Oxford, Peter Lang, 187-200.

Verbruggen, Nakita (2010), *The translation of wordplay in fansubs and original subtitles: A comparative study*, Master's Thesis, Ghent University, <http://lib.ugent.be/fulltxt/RUG01/001/457/866/RUG01-001457866_2011_0001_AC.pdf> (accessed 10 December 2022).

Whittock, Jesse; Goldbart, Max (2022). 'Netflix Opens Rome Office as Reed Hastings Details Streamer's Italian Roots; Launches Huge Slate of Series & Films Including "Robbing Mussolini" & Debut Reality Show', 6 May Issue, 2022, <https://deadline.com/2022/05/netflix-opens-rome-office-reed-hastings-1235017699> (accessed 10 December 2022).

Websites

Ampere Analysis Reports, <https://www.ampereanalysis.com/reports> (accessed 10 December 2022).

ATRAE, <https://atrae.org/> (accessed 10 December 2022).

AVTEUROPE, <https://avteurope.eu/avte-machine-translation-manifesto> (accessed 10 December 2022).

Broadband TV News, <https://www.broadbandtvnews.com/2022/03/08/hbo-max-expands-to-central-and-eastern-europe> (accessed 10 December 2022).

Caption Hub, <https://captionhub.com> (accessed 10 December 2022).

ECaption, <www.ecaption.eu> (accessed 10 December 2022).

IMediaTrans, <www.imediatrans.com> (accessed 10 December 2022).

Plint, <https://plint.com/> (accessed 10 December 2022).

OOONA, <www.ecaption.eu> (accessed 10 December 2022).

Slator, <https://slator.com/how-netflix-does-subtitling-for-the-world-ex-china/> (accessed 10 December 2022).

SUMAT, Subtitling by Machine Translation, <https://cordis.europa.eu/project/rcn/191741_en.html> (accessed 10 December 2022).
The Guardian, <https://guardian.ng/apo-press-releases/disney-arrives-today-in-south-africa/> (accessed 10 December 2022).
The POOOL, <https://the-poool.com/certification/> (accessed 10 December 2022).
ZooSubs, <https://www.zoodigital.com/technology/zoosubs/> (accessed 10 December 2022).
Zoo Digital, <https://www.zoodigital.com/about/zoo-academy> (accessed 10 December 2022).

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