New Technologies and Artificial Intelligence in the field of language and conference services

Host paper by the European Union Institutions for the 2019 International Annual Meeting on Language Arrangements, Documentation and Publications (IAMLADP), 27 – 29 May, Brussels.

INTRODUCTION

1 Developments in new technologies and Artificial Intelligence ("AI") have in recent years had a **transformative effect** on a great number of automatable tasks across many industries and professions, including certain core tasks relating to language and conference services. Ever-evolving language technologies ("LTs") have led to a gradual **paradigm shift** in translation, interpretation and conference services. New technologies are more often seen as a part of their architecture. Based on AI, data analysis is shifting from a simple description of the past to a predictive and prescriptive analysis for decision support or even autonomous performance, thus driving change in services likely to be relevant to most IAMLADP organisations. In this respect, the challenges stemming from progressively increasing use of new technologies and automation are affecting international organisations in many aspects of their work.

Artificial Intelligence (AI) denotes any technology (software, algorithms, sets of processes, machines etc.) that shows intelligent behaviour and is able to function appropriately in line with its environment. By analysing its environment AI can perform various tasks with some degree of autonomy to achieve specific goals.

Language Technologies (LTs) study and develop the means by which computer programs or data processing devices can analyse, produce, modify or respond to texts and human speech. LTs cover many areas and disciplines including multilingual content management, natural language processing, speech technology, information extraction and machine translation.

Machine learning is the scientific study of algorithms and statistical models that computer systems use to become, often progressively, more accurate in predicting outcomes and to effectively perform a specific task without using explicit instructions, relying on patterns and inference instead. Machine learning enables computers to "learn" without being explicitly programmed.

Deep learning is a subfield of machine learning methods based on learning data representations, as opposed to task-specific algorithms. It builds algorithms by using multi-layered artificial neural networks which are mathematical structures, inspired by biological neurons.

Data mining is the automation of exploratory statistical analysis on large databases. Its goal is to extract patterns and intelligence from such databases to convert them into a more actionable data structure and size for further analysis and use.

NB: AI, machine learning and deep learning are examples of machine intelligence, but they vary in terms of usage and potential impact. Most organisational-scale technologies use a wide range of automation, but not all of them are AI. Differentiating between AI and other methods can be difficult, and there may be some overlap. The terms AI and machine learning are sometimes used interchangeably.

2   Mirroring the wider impact that new technologies and AI have on society and the economy, LTs and AI provide significant **potential benefits** for language and conference services and are therefore already an integral part – albeit to varying degrees – of the everyday work of many IAMLADP members as they move into new ways of working, which can reinforce agility, collaboration and efficiency. The challenge for the future is to capitalise on this positive development in order to increase the potential benefits, while identifying **potential limitations** and mitigating **risks** linked to the enhanced use of LTs and AI. Adaptation and integration of an **institutional AI strategy** and building a **corporate culture** open to **AI implementation** has become, or might soon become, a strategic objective for a growing number of IAMLADP members. Investing in **technically savvy talent** and implementing **AI-optimal data management** could then become part of the operative planning of those members.

3   The Host Paper presented by the institutions of the European Union ("EU") [1] is based on their experience in the domain of language and conference services and professions and will showcase relevant projects and initiatives in order to (A) describe the current situation and expectations for the future, (B) focus on the relevant advantages and benefits of LTs and AI, (C) identify possible obstacles

---

[1] The European Parliament, the Council of the European Union, the European Commission and the Court of Justice of the European Union.

or limitations, (D) lay out the conditions for adaptation, and finally (E) formulate some questions for IAMLADP members to reflect on.

A.   THE REALITIES OF TODAY AND TOMORROW (inventory and projection)

4   **Computer-Assisted Translation tools** ("**CAT tools**"), as computer programs creating virtual platforms that help translate any type of content more efficiently through functions such as automation of translation project creation, retrieval of background material, use of translation memories, reuse of previously translated text, terminology search and delivery of the translation, have revolutionised the translation profession. At EU level, they give language professionals access to the relevant language and phraseology resources retrieved both from a central translation memory (Euramis), and from locally created translation memories. CAT tools have now become the standard editing application used by linguists; user feedback is positive and reflects significant efficiency gains.

Feedback also shows, on the other hand, that CAT tools (i) can be inconvenient in terms of user-friendliness, especially for editing and post-editing and (ii) are often insufficiently integrated with other components of the CAT environment (terminology, machine translation, workflow and content management applications). Accordingly, the biggest challenges in this field seem to be (i) obtaining more integrated user interfaces, (ii) improving the ergonomics of language professionals' environments in order to better fit the needs of users and (iii) getting the various applications involved to speak to each other: in other words, achieving simpler CAT environments, with better design and comfort for users, which cover all aspects and phases of the translation process. The use of structured file formats, which make it possible to separate content from presentation (and thus automate document production) and achieve better interoperability across all CAT components, is a precondition for reaching that goal. Arguably, the future smarter CAT environment is yet to be developed. In this connection, the Council of the European Union has established workflows based on the XLIFF[2] format for the translation of material from content management systems (in particular website content).

5   **Machine translation** ("MT"), i.e. translation carried out by computer software without human intervention, has in recent years also become an integral part of a linguist's toolbox. Regarding the translation industry in Europe as a whole, the latest Language Industry Survey conducted by several organisations of the translation profession stated in its report: "We will remember 2018 as the year in which more than 50% of both the companies and the individual language professionals reported

---

[2] XML Localisation Interchange File Format.

that they are using MT in one form or another."[3] Although Rules-Based MT and Statistical MT ('SMT') dominated the landscape until recently, **Neural MT** ("NMT") marks a paradigm shift by using neural network and deep learning techniques to predict language usage patterns, achieve greater fluency and create higher quality output. The improvement is especially significant for morphologically complex languages that were only poorly served by the previous technology. However, the fact that NMT output typically reads rather well can make it difficult to spot inaccuracies and mistranslations.

NMT will be able to reach its potential more fully if it can rely on **high-quality data**, competent **data management** and proper **methodologies** and **tools for the evaluation** of its output. Indeed, while NMT may seem less data-hungry, it is more data-sensitive, meaning that it needs cleaner, more subject area-specific data, which in turn means that it needs reliable data from translation memories, managed by people who know how to process it. It may actually need a larger corpus in order to provide good results[4]. Quality estimation tools and proper score indicators will also be essential in ensuring that the technology can be used with confidence.

eTranslation, the EU's MT service, has followed the field's move into NMT. It builds on the European Commission's earlier MT service (MT@EC), which was developed by its Directorate-General for Translation (DGT) and was based on an SMT system. The strength of eTranslation lies in its uniquely multilingual nature, since it covers all official EU languages, in its reliance on the vast Euramis translation memories, comprising over 1 billion sentences produced by the language professionals of the EU institutions over the past decades, and in its highly confidential and secure treatment of all translated data. eTranslation was launched in November 2017 and has been operating in its full capacity since June 2018. The service is open to EU institutions and bodies, national public administrations in the EU Member States and European online services funded or supported by the European Commission. Its main goal is to help European and national public administrations exchange information despite the diversity of languages in the EU, by providing MT capabilities that will enable all digital service infrastructures to be multilingual. Public administrations, citizens and businesses in the EU will thus be able to use digital services in the language they choose.

Most EU translation services have integrated eTranslation in their pre-processing arrangements and provide NMT output to their linguists. Some customised features can be particularly helpful; for example, the Court of Justice of the European Union favours neural motors operating from French, its working language, to all languages without the need for an English relay, on the basis of corpora building exclusively on its case-law. While it is yet too early to fully evaluate the impact of the technology on productivity or quality, the experience of DGT shows that the introduction of NMT has led to a greater acceptance of this technology among language professionals.

---

[3] 2018 Language Industry Survey – Expectations and Concerns of the European Language Industry
https://ec.europa.eu/info/sites/info/files/2017_language_industry_survey_report_en.pdf
[4] Example: "Six Challenges for Neural Machine Translation", Philipp Koehn and Rebecca Knowles, https://arxiv.org/pdf/1706.03872.pdf

6   While LTs have already had a transformative effect on the core tasks in the translation profession, the field of **conference interpretation** has not yet witnessed a fundamental paradigm shift on account of their use. LTs and AI have not yet matured in this field into a tool broadly deemed to offer the level of performance necessary to satisfy a reasonably demanding audience. Software still lacks most of the cognitive, cultural, intellectual and emotional capacities that are paramount for quality interpreting, in particular the ability to use the semantic context in the way the human brain does, and cannot fully cater for the operational constraints (such as security, confidentiality, duty of care for linguistic staff working full-time) of institutional conference interpretation, as delivered at the level of international organisations. Nevertheless, LTs including AI can substantially improve **interpreters' preparation** for a meeting as well as provide them with useful tools while working and accordingly boost their performance in the booth. In addition, technology, automation and AI have the potential to transform **supporting services** of conference interpretation, such as managing demand for interpretation and planning interpreters' assignments.

7   In the field of meeting preparation, the European Commission's Directorate-General for Interpretation is working on the **Interpreters' Digital Toolbox Project**; put simply, it is a digital interface which will help to identify the most relevant documents for a given meeting, to extract terminology automatically, to draw up event-specific glossaries based on the interpreter's personal profile, and to offer a wide range of information sources. The ultimate objective is an integrated, AI-assisted interface, which could also draw on speech recognition capabilities in the future: interpreters could, for example, immediately check the figures, names or terms used by the speaker. It has also launched the **Knowledge Centre on Interpretation**, a digital platform used to manage and exchange knowledge, create synergies and disseminate best practices on conference interpretation and more, designed to connect diverse communities with interests in interpretation, including, for instance, public-service and legal interpreting.

In addition, the European Commission is exploring ways to automate certain tasks relating to the management of interpretation services using AI. **Programming** up to 1000 **interpreters' assignments** for an average of 40 meetings a day, often involving large language regimes, is extremely complex and human-resource intensive. The objective of the programmer is to allocate the available resources efficiently and to ensure a balance between the best possible language coverage and assigning interpreters with the right skills. Programming involves applying up to 200 variables, all conducive to quality interpretation, including those relating to respect of working conditions or the consideration of the duty of care. The development of an AI-based tool remains a challenge because of the many conflicting criteria used by humans to make a sound decision, not yet matched by an existing AI tool.

Furthermore, the European Commission, in cooperation with the other EU interpretation services, has also played an active role in the ISO discussions about technical standards for the quality of image and sound for distance interpreting. The Directorate-General for Interpretation is planning a series of tests of software and **cloud-based platforms** that could be used for the provision of

simultaneous interpretation. The idea behind the concept is to reduce the need for expensive conference equipment and to remove many of the technical and spatial constraints on conferences. It expects that the planned tests will reveal both the potential and the limitations of such platforms and will allow for interpreters' needs to be taken in account at the ISO discussions.

8   **Terminology tools** are another good example of the use of LTs for the benefit of language professionals and the services they provide. The efficient creation, management and use of terminology bases help language professionals achieve the goal of consistent and domain-adapted results, while integrating terminology into MT remains a challenge for the future. Terminology tools and functions such as term extraction and domain identification are of primary importance for interpreters who need to be able to use accurate terminology at meetings. In November 2018 the translation services of the EU institutions launched a new version of the EU terminology database IATE (InterActive Terminology for Europe). IATE has been available to the EU institutions since 2004 and to the public since 2007. With around 1.2 million entries and over 8 million terms in all EU official languages, IATE has become the terminology reference *par excellence* not only for language professionals, but also for national experts, policy advisers, public administrations, academics and private sector companies operating across a wide range of specialist areas. The database receives an average of 50 million queries per year, which shows that it is a highly popular tool for users looking for the right terminology. Search results offer greater accuracy owing to technology that uses customisable language analysers and the interface for viewing the results and full terminological entries has been enhanced, with more metadata and bilingual, trilingual or multilingual display options. Further integration of IATE with CAT tools is also planned through enhancement of terminology retrieval possibilities and achieving an interactive display of terminology in the CAT tool interface.

9   **Speech recognition** is another human language technology with practical benefits in the field of language and conference services. When combined with other applications such as automated translation, summarisation, semantic analysis or sentiment analysis, speech recognition could expand the range of services provided to customers of language services and in particular meeting participants. It could also improve the accessibility of conferences to **hearing-impaired persons** (through instant subtitling) while text-to-speech technologies will help **visually impaired persons**. Low-latency speech recognition could also be integrated in **interpreters' "digital workplace"** to provide them with an instant transcript and translation of named entities, acronyms, figures and terminology. The EU institutions are taking steps towards using these elements in conference interpreting and conference management but there is still no large-scale, systematic implementation. However, in the EU institutions a number of language professionals are already using speech recognition software. This allows users to dictate text directly onto their computer in a natural, continuous way, achieving a high degree of accuracy and efficiency, thus being a real time-saver for language professionals as well as a means to improve the accessibility of CAT tools. Another example of the use of such technology is the **automated transcription of audio-visual material**

(including for the purposes of translation). The uptake of speech recognition technology has been limited by the fact that this technology has been developed by vendors for only some of the EU official languages. Tests are being carried out with other products to try to find suitable software for other languages as well, but availability is limited in this field. However, EU institutions often record meetings and draft minutes, which would provide a significant data set to train a multilingual speech recognition model.

10   In the area of **conference management**, many tasks are being digitalised, from back-office bookings and registration management to on-site conference support. For example, one-stop self-service digital solutions are becoming the standard in many organisations, the conference assistants or guards for accreditation of conference participants are assisted and potentially could be replaced by portals for self-scanning based on Quick Response (QR) codes or facial recognition. Digital tools have reshaped the way events are being managed, with back-office dashboards, automatic prompting for deadlines, automated distribution of documents, connection of participants through dedicated apps, etc. These changes are helping organisers to "green" their events, e.g. by cutting down on the volume of printed documents. At the same time, more and more **events are becoming "hybrid"**, i.e. combining a traditional "live" face-to-face meeting setup with a "virtual" online component. For conference organisers, opening up to various forms of remote participation (video messages as a form of delivering content, videoconferencing, social network feeds, live polls and voting, etc.) has the advantage of increasing an event's audience and impact at little or no cost, and without having to overcome the constraints of room size and capacity, security, air travel, etc. For remote or "virtual" participants the ability to engage, express a view, ask questions etc. makes the event more attractive. In the field of conference metrics, post-event surveys and sentiment analysis using AI tools is helping conference organisers assess the success of their events.

B.   GENERAL ADVANTAGES AND ADDED VALUE

11   From a general point of view and in addition to the specific positive elements mentioned above in relation to specific domains and tools, LTs and AI provide obvious advantages in the sense that, by promoting better understanding and functioning of the human-machine symbiosis, through the automation and rationalisation of certain language-related workflow processes, a series of tasks can be mainly, or even entirely, performed by workflow automation and content management software. Potential **acceleration of work processes** improves **overall efficiency** since less time is needed for the same tasks. This would allow humans to concentrate on **more meaningful or quality-control-related tasks**. Routine and technical tasks, in particular, no longer require the same degree of human intervention, thus requiring fewer man-hours. LTs and AI ideally take over the mundane part of language professionals' work, making it possible for them to spend more time on the creative aspects. Similar advantages can be achieved in relation to the everyday work of interpreters. LTs and

AI reduce the time and effort required by interpreters to prepare for their meetings and enhance interpretation quality at those meetings as they provide an integrated knowledge base which allows interpreters to concentrate on understanding and analysing rather than looking for terms, names, entities etc. They also improve post-processing after the assignments, self-assessment and training/professional development, thus leading to real "augmentation" of the interpreters' capabilities and greater customer satisfaction as the interpretation output corresponds more closely to the customers' needs.

In addition, digitalisation and AI-based tools, if successfully used to improve (for instance through targeted automation) the **planning of interpreting assignments**, will lead to efficiency gains as they will contribute to optimising the use of language combinations, specialisations, thematic expertise and continuity and alleviate the work of human programmers. This could lead to increased efficiency and higher quality in the final output as human resources would be used optimally. In this way the services responsible for planning and the recruitment of interpreters could benefit from productivity gains driven by the use of technologies which would combine variables much faster and more efficiently while leaving human planners with the more creative task of successfully matching interpreters with meetings. Such gains would constitute significant added value for managers and customers.

Provided that quality of interpretation and duty of care are catered for upstream, the use of digital technologies to provide **distance interpreting** in certain circumstances makes the delivery of interpretation more flexible and adaptable to customers' needs, in particular for the extensive language regimes used at EU meetings (sometimes more than 24 active and passive languages). The available infrastructure can accordingly be used in locations where it is difficult to host all the required booths and so allow for the provision of larger language regimes. Moreover, the use of distance interpreting, thanks to various technical tools, allows for interpretation at virtual meetings and can lead to a significant reduction in the carbon footprint of meetings in the broadest sense, including interpretation services.

In the area of conference management, new technologies are changing the management of events and participants' experience; e.g. registration tools for participants offer comprehensive features ranging from on-line registration in accordance with existing data protection rules and instant and easy two-way communication with participants to managing the personal needs of participants. Digital solutions replacing traditional signposting and documentation are leading the way to greener events. More and more frequently, conferences are using digital tools to interact with audiences in a modern way and to replace some face-to-face meetings with videoconferences, etc. This will result in efficiency gains and savings in travel costs, thereby enhancing stakeholder engagement.

12 Such technological changes can lead not only to **better working conditions** and more interesting working tasks, as indicated above, but also to new ways of working, such as the **virtualisation of work environments**, of collaborating and of providing services, such as **remote working**, **augmented reality**, etc. Furthermore, LTs and AI create a new symbiosis between the

machine and highly competent language professionals with an increasing number of technical skills. The fear that the enhanced use of LTs and AI could lead to a loss of jobs or could even make whole professions redundant should be viewed in the light of the emergence of **new language-related services and jobs** that are necessary in order to cover the new needs. For example, since MT means more translated material than ever before, there is a greater need for **editors** to guarantee the quality of the output and for **data curators** to ensure reliable data in order to train the machine. The adaptation of content to the language preferences and cultural characteristics of specific geographic regions can only be obtained through **experts in localisation services**, thus pointing to another domain where human intervention is key.

13   It seems that an increasing number of stakeholders are starting to consider the quality aspects of language services primarily from a business perspective. For organisations that use or provide language services, **language quality,** much more than simply a matter of style, is a factor that directly affects their core activity. When the linguistic services of IAMLADP members are striving to ensure efficient multilingual communication, **quality** in its **broadest sense** is of utmost importance. The added value that LTs have brought in this respect – notably in terms of increased efficiency and consistency – is particularly significant. In future, the automation and decision-support potential of AI could further enhance that contribution in the area of translation, interpretation and conference management.

As an increasing number of organisations have integrated MT as an additional resource in their translation flows, **quality evaluation** of MT output should become a more important issue. Some freeware tools already allow quality evaluators to compare and manually assess raw outputs from different MT engines. The outputs may be assessed in absolute terms, using in-house metrics or ones designed specifically by the evaluators themselves. Indeed, evaluating the quality of a translation work product as opposed to evaluating a translation process is an important matter, particularly as regards standardisation of methods.

For many organisations the predominant criterion is not price, time or quality alone. In most cases the decisive factor is quality versus cost and time. And while cost and time are relatively easy to quantify, that is not the case for quality. Without quality metrics, organisations could have difficulties in defining a roadmap for their objectives. An accurate tool is therefore essential in order to measure the quality of services; the results of several ongoing initiatives are likely to shed more light upon this matter.

14   From a broader and more political perspective, the use of LTs and AI with their added value for the various stakeholders and, in particular, high-quality results can be a **key driver for multilingualism** and **safeguard linguistic diversity**. The example of the EU, with more than 500 million citizens and 24 official languages, is testament to this. The harmonious co-existence of many languages is a powerful symbol of its aspiration to be united in diversity as a core value. Multilingualism is a means of defending a pluralistic society and valuing the diversity of the cultures

represented in the EU. Multilingualism is also a stepping stone for **effective** and **credible multilateralism**, which constitutes an important political objective for the EU. EU citizens must be able to experience the strengths and benefits of the EU directly in their own language to foster democracy and a sense of ownership and fairness. A successful multilingualism policy can open up lifelong opportunities for citizens: it may increase their **employability**, facilitate **access to cross-border services** and **protection of rights**, and contribute to solidarity through **enhanced intercultural dialogue** and **social cohesion**. In everyday life, LTs and AI can be especially useful in cases where huge content volumes are produced and fast translations are needed (technical support services, media monitoring, social media content), especially in language pairs where there is a shortage of humans as language service providers and where multilingual coverage is nonetheless essential.

C.   BARRIERS AMD LIMITATIONS

15   While LTs and the relevant AI are very sophisticated and useful, they are not yet mature. However, AI has recently become a buzzword that is often depicted in mainstream media as a technology that is already able to solve all problems in the field and match human quality. Examples of failures of AI to perform as expected are, on the other hand, sometimes used to dismiss the technology altogether. Authorities, hierarchies and clients, having paramount and particularly legitimate considerations about productivity and cost-effectiveness in mind, might develop **biased expectations** if not guided by technical and operational experts, who will appraise the financial and training investments required, avoid **too little** or **too much enthusiasm**, manage "hype" and indicate potential technical limits or opportunities.

16   A feeling of **insecurity** and **uncertainty** among language professionals and a certain **duty of caution** or even **resistance to change** should not be underestimated. As long as linguists do not fully benefit from the potential of existing technologies and see LTs and AI as a potential threat to the very existence of their jobs, they might only reluctantly embrace the transformation that their professions are going through. Even those who are more open to change can find themselves objectively incapable of keeping up with the technological developments and feel overwhelmed by the new systems and tools which they are expected to use in order to save time and increase their productivity. Technological stability and compatibility with previously used and reliable structures is a further concern for language professionals. Change management is therefore a crucial element in the overall strategy of IAMLADP organisations.

17   While the **quality of language-related services** will benefit greatly from LTs and AI, certain risks in that regard should not be disregarded. There is, for example, some concern that MT affects the command of the language and that in particular full-time post-editing of MT affects linguists' writing skills. Moreover, a merely acceptable machine outcome (as opposed to an optimal human

outcome) could increase the tendency towards an approach where lower quality of translations would be considered normal. The notion that machine translation without any human intervention is better than no translation at all can indeed be valid in some contexts. It is however important to raise awareness that "fit for purpose" requires, for many IAMLADP organisations, a level of quality that cannot be obtained without human intervention. This is, for example, the case for many EU institutions translating documents that have legally binding effects, in particular in the judicial or the legislative field. Subtle or substantial errors produced by NMT could have damaging effects. While poorer reliability and style may be acceptable in some cases, they should not become the new normal also in professional situations.

18   Since the quality produced by LTs and, in particular, AI depends extensively on clean and trustworthy data, the **absence of adequate data curation** or evaluation for the **massive volume of data** available today could prove to be a serious hurdle – or give rise to a new professional orientation among organisations' in-house linguists. Where MT is concerned, organisations need to constantly feed human-quality data to the machine to "train" it. Those data should reflect each organisation's specific needs in terms of domains. In order to build a specific-purpose tool on the basis of a general-purpose tool, organisations therefore need to train the MT systems with human-quality, recent and domain-specific data. The need thus arises to ensure that machine translation results are properly corrected before they are fed back into the system as training material. Furthermore, the use of confidential, personal and sensitive data raises **security, data ownership** and **privacy** and **data protection questions** that are currently hot topics.

19   As far as interpreting is concerned, an initial element to consider is that the advances in technology are currently far from fit for purpose due to the particular characteristics of conference interpreting as a professional activity. It has to be noted that interpreting takes place within very strict time restraints that do not allow for proof reading and quality control before delivery. There is currently no digital or AI model which would combine an accurate **low-latency multilingual speech recognition model** with efficient machine translation (taking into account the technicalities of each domain) and a text-to-speech tool which would sound reasonably natural. Moreover, such a model would need to cater for the "**empathic listening**" of the interpreter and achieve a level of "intelligence" which is well beyond current and foreseeable capabilities. Empathic listening is the interpreter's ability to listen to the original oral communication in order to extract the essence of the message – which places the interpreter at an emotional level with the speaker and takes into account the non-verbal part of the message: body language, facial expressions, mood, intonation, language register etc.

A second important characteristic is the interpreter's ability to **accumulate domain knowledge** in the semantic context when preparing for their assignments, and thorough experience and **versatility** in terms of adapting to very different contents of meetings. That involves specific terminology, but also understanding of concepts and context and the corresponding phraseology. The interpreter's priority is to get the message across. Terminology research is necessary, but will be useless if the interpreter

does not acquire and convey the thematic and contextual knowledge behind the words. Thirdly, the reformulation in the target language, parts of the domain knowledge and emotional skills of the interpreter come into play again. At the current level of development of digital technologies, LTs and AI have not demonstrated the capacity to produce a final interpreting product which can contain all the above. This becomes even more evident in the case of languages with a more **limited digital legacy**, which is the case to very different degrees for almost all EU languages apart from English, and to a lesser extent French and Spanish[5]. In other words, the final product currently produced using the various technological tools does not reach the required level of quality. For this reason, interpreters, as main stakeholders, but also end-users, have limited commitment to the technologies for this part of their potential use.

Interpreters also express two main types of concerns arising from the use of distance interpreting methodologies. First, there are questions about the quality of the final output due to the limitations on sensory input and to the increased risk of cognitive overload. Secondly, health and safety issues need to be studied and addressed as the use of such technologies might lead to greater fatigue, increased stress and a sense of alienation from the meeting and possibly from the interpretation team.

20   The impact of these technologies is particularly important when one considers the customers' and end users' requirements in the areas of **confidentiality, security** and **data protection**. As the technologies are mostly cloud-based, they do not – at least at this stage – offer the required guarantees of confidentiality of proceedings, which is an essential condition in interpreting assignments, and of security, when assignments are about sensitive issues. From a technical point of view, it is also necessary to ensure that the required quality of the sound and image used by the interpreters complies with the relevant **ISO standards**. The existence, quality and stability of the IT connection are additional requirements for the acceptability of new technologies in interpretation. The cost of secure and reliably stable IT connections is quite considerable and therefore it is necessary to carry out sound cost-benefit analyses in order to achieve stakeholder engagement at the level of professionals and end-users.

21   In the field of **conference management**, the increasing prevalence of various forms of remote participation (videoconferencing, social network feeds, live polls and voting) adds an element of complexity to the challenges outlined above, in particular for conferences that also require interpretation. The seamless integration of interactive content and remote participants depends on hardware and software quality, bandwidth, connection stability etc. and requires large screens. In multilingual conference settings, this requirement is sometimes difficult to reconcile with sound and image quality requirements for interpreters. For instance, the European Parliament's Directorate-General for Logistics and Interpretation for Conferences has been faced with this challenge on

---

[5] Although efforts are being made to remedy this situation at the EU level, cf. European Language Resource Coordination http://www.lr-coordination.eu/

multiple occasions, particularly in the context of high profile events relating to the European elections. "Virtual" conference components also affect the proceedings, with new roles complementing the traditional chair (moderator, virtual master of ceremonies, etc.) and changes in the pace and dynamics of the discussions and interactions. In parallel, the deployment of back-office event management, registration and analytics tools raises new data protection issues in the context of the General Data Protection Regulation. The use of social networks, polls, voting, etc. are becoming a default part of the communication strategy of events. This also creates costs because it imposes further practical constraints which generate additional indirect costs.

D.   CONDITIONS FOR ADAPTATION

22   In light of the above, a number of prerequisites for adjustment need to be addressed. First of all, IAMLADP member organisations must ensure that **internal and external expectations** are **managed properly**. It is very important to be aware of and to accept what LTs and AI actually can and cannot do. One needs to separate "wishful thinking" from reality and better understand the limitations and potential of AI implementation, especially in an institutional context. Organisations must therefore be cautious in managing the expectations of stakeholders and clients to make sure such expectations remain in line with the actual performance of AI. To this effect, the **necessary budgetary means** must be deployed and **appropriate technological choices** must be made. Interoperability between existing and new systems and tools involving various technologies is also essential. Financial, intellectual and technical investment, pragmatism and cooperation will allow IAMLADP member organisations to meet those expectations. At EU level, the European Commission presented its vision for the future in its **Communication on Artificial Intelligence for Europe** of 25 April 2018. It proposes an approach aiming to make the most out of the opportunities offered by AI, based on increasing public and private investments, supporting research and preparing for socio-economic changes brought about by AI, while ensuring an appropriate ethical and legal framework.

23   **Senior and middle management** in IAMLADP member organisations have a crucial role to play in order to ensure proper communication, to positively influence staff and ultimately to promote and implement change. It is of paramount importance to adopt a **human-centric approach** and to reassure language officials that they are not being replaced. The revolutions of the internet and mobile technology have created many more jobs than they have eradicated and AI could have the same effect. Since LTs and AI systems largely deal with individual tasks and not whole projects, a "human in the loop" will be necessary. This means that AI systems will lead to changes in the tasks carried out by humans, which will become less repetitive but more dependent on the good functioning of IT. By entrusting repetitive tasks to software, language professionals will have more **time and energy to devote to valuable tasks**, such as terminology development, quality control, improvement of multilingual communication, tailoring content to target groups, transcreation, etc.

LTs and AI must be understood as being complementary to humans, including where no human intervention would be possible. Training, inclusion and adaptation are indispensable. The experience of EU institutions and bodies has been mostly positive so far. There is more curiosity and less scepticism amongst colleagues, and staff are encouraged and trained to become proficient users of LTs, while being aware of the relevant risks. The huge potential for better working conditions is acknowledged, for both language professionals and support staff.

24 While linguistic skills naturally remain at the heart of language professions, development in LTs and AI demands a strong focus on **diversification** and **enhancement of skills**. The future will see the skill-set for language professionals shift to a certain extent to digital. The new opportunities offered by the digital economy will require **superior technical skills** and knowledge. The biggest challenge is to demystify the various concepts and requirements and to integrate technology and digital aspects into the traditional profile of a language specialist. Perhaps the most necessary skill in this regard is "**digital confidence**", i.e. accepting and being ready to adapt constantly to new tools and developments. At the same time, "**digital linguists**" will have to develop a wide range of specific skills relating to the use of LTs and AI, such as quality control of automated content, translation memory maintenance, etc. At EU level, the discussion is already under way as to the competencies that will be required for language professionals in a digital world, how to integrate those skills into the job profiles and descriptions of the future and how to organise selection procedures that will allow recruitment of officials capable of meeting future demands.

The European Commission's Directorate-General for Translation has taken several measures to prepare its staff for the growing importance of technology in the profession. The creation of the post of Language Technology Coordinator in 2018 in each of its 24 language departments aims to improve digital skills and foster the best use of technology. A digital skills survey carried out in 2018 among staff led to an overview of existing competencies and the development of targeted training initiatives. An "AI Incubator", a cross-departmental think tank, has started reflecting on the potential relevance of AI and data technologies for the services.

For its part, the Translation Service of the Council of the European Union has established a CAT Network, comprising two representatives from each of its 24 language units and members of its central Language Technology Team, for the purposes of circulating information to and collecting feedback from language units on CAT tool matters. Another essential component of its information and support framework is its CAT Helpline, a designated group of translators and translation assistants who voluntarily provide peer-to-peer support across all language units, in collaboration with the IT Helpline and using the IT department's issue tracking system to manage support requests. Inter alia, in response to requests from various Council departments, the Council Translation Service has also started to diversify its services beyond translation into areas such as media monitoring (including social media) and language consultancy.

25 Deciding on a widely acceptable set of digital skills and competences for language officials requires close **cooperation with academic partners**, as well as a thorough examination of the situation in the **private sector**, in order to establish the portfolio of skills for which students receive formal training and to assess the actual demand for such skills on the market. The **European Master's in Translation** ("EMT") is a partnership project between the European Commission and higher education institutions offering master's level translation programmes. The European Commission's Directorate-General for Translation awards this quality label to master's-level university programmes in translation that meet agreed professional standards and market demands. The EMT competence framework, drawn up by experts and first published in 2009, defines the basic competences that language professionals need to be able to work successfully in today's market. This has become one of the leading reference standards for language professionals' training and translation competence throughout the European Union and beyond, both in academic circles and in the language industry. The new competence framework adopted in 2017 for the period 2018-2024 emphasises technology competence and includes knowledge and skills used to implement CAT tools, MT and workflow management software as an integral part of the translation process. A successful forum for further collaboration with industry and academia is the annual Translating Europe Forum organised by the European Commission, which in November 2018 focused on "Translation in the Age of Data". It examined how AI is transforming society and the language industry, discussed what the state of the art and the future of NMT is, analysed several aspects of working with data and dealt with the re-framing of language professions.

Similarly, EU institutions cooperate with universities which train interpreters and should promote the integration of training for digital skills or skills which are necessary for interpreters who use digital technologies in the universities with which they cooperate. To that end, the 2019 edition of the European Commission's Directorate-General for Interpretation Universities Conference, the forum where the Commission meets all the relevant partners in the field of interpreter training, has been dedicated to the preparation of the interpreter of the future. A debate on how the universities can innovate and incorporate in their curricula new technologies on distance interpretation, the interpreting digital toolbox and AI was organised as part of the conference, with the aim of reflecting on the subject of "the augmented interpreter". Cooperation with universities, the research community and the professionals of tomorrow is vital for the profession to survive and adapt to the demands of users. Over the years, the EU interpretation services have been guiding and financing the EMCI, the **European Masters in Conference Interpreting** within the framework of the European Union's drive towards the promotion of knowledge through wider access to specialist education and of the objective of improved employability through the acquisition of specialist competence. The curriculum was developed in consultation with the European institutions and the continuation of this cooperation is an integral part of the programme. In order to honour their commitment to quality maintenance as laid down in the EMCI Quality Assurance Standards, the participating universities regularly review changing needs and new developments and permanently update the programme.

The programme has to make use of new technologies where appropriate and has to contribute to the dissemination of their application.

26 Exploiting the full potential of LTs and AI requires **genuine and comprehensive multilingualism** as regards both their development and their results. Appropriate action should be taken to ensure the development of LTs not only for English or other widespread languages such as Spanish, French and German, but also for languages which are less widely spoken and are at a significant disadvantage on account of a lack of multilingual tools and resources. The **European Parliament's resolution** of 11 September 2018 **on equality of languages in the digital age** calls for EU and Member State language-related research and education policies that will contribute to preserving lesser-used languages in the digital world and in achieving high-quality linguistic coverage through intensive use of LTs and AI.

27 This will be possible only through the **sharing and expansion of data and resources** (corpora and terminology) as well as through **proper data maintenance and curation**. In recent years the EU has been making available an unprecedented amount of multilingual parallel corpora not only to EU institutions, public administrations and citizens, but also to international users. The EU legislature advocates an **open data policy** for public sector information that can be readily and widely accessible and re-used. In the resolution referred to above, the European Parliament highlights the importance of text and data mining techniques for the development of LTs, underlines the need to strengthen collaboration between industry and data owners, and stresses the need to adapt the regulatory framework and ensure a more open and interoperable use and collection of language resources. This vast amount of resources and data used by LTs and AI raises serious questions about **security and confidentiality**, especially when it comes to personal and sensitive data. The free flow of data often risks violating the fundamental right to privacy, which needs to be carefully weighed against the right of access to information. Data flow and use could benefit from a convergence of the different standards of data protection that apply according to the **legal and ethical framework** in place in different countries. The EU has some of the highest standards of data protection, as laid down, inter alia, in the General Data Protection Regulation that came into force in May 2018.

28 Finally, discussion and sharing of **criteria and estimators for the evaluation of return on investment** for LTs and AI in language-related services could be helpful for many IAMLADP member organisations. This could make it easier for organisations which already make extensive use of relevant systems and tools to analyse the results achieved and to decide on further investment. It could also give smaller organisations the comparative data and performance estimators that could allow them to decide on how to use LTs and AI in accordance with their dimensions and objectives.

E.   SUMMARY

29   The aim of the Host Paper has been to assess the impact of, and to outline the prospects associated with, the emergence of new technological approaches, in particular LTs and AI, for language-related services and activities in the areas of translation, interpretation and management of conferences.

30   LTs and AI have been described as the third revolution as far as human language is concerned, after the creation of the alphabet and writing and then the invention of printing. As with every (r)evolution, what for some is a success and reason for excitement, for others sparks caution or even fear. AI will probably follow the example of previous technologies that have become ubiquitous. Smart data management and machine intelligence will eventually become standard features for any institution that wants to continue delivering value in an **increasingly automated** world. While it is true that the languages services are, from that point of view, in a transition phase, it is also certain that these changes open up new opportunities. The current globalisation process requires various language barriers to be overcome while preserving the **wealth of linguistic diversity**, and, in that sense, the volume of translation and interpretation work will continue to increase, as market trends indicate. Feedback received so far suggests that LTs and AI produce positive results for language professionals and that a new working culture is emerging in which an optimistic, or even enthusiastic, approach towards LTs and AI is the way forward.

31   Of course, challenges and room for improvement remain. With the drive for efficiency gains comes a risk for **conflicting expectations** and tensions. Over sixty years, the EU language services have demonstrated their **agility and adaptability** in embracing changing working methods and technologies as they have evolved over the decades and can be confident in their ability to adapt again to AI in translation. It is incumbent on language professionals to identify both the pitfalls and the potential solutions to enable their management and authorities to take informed decisions regarding the use of LTs and AI for different purposes, in combination with checks and balances. In addition, in a multilingual system comprising many languages with a varying degree of prevalence of use and number of speakers, such as the EU's system of 24 official languages, we must enable the use of LTs to result in a **greater wealth of language resources** in all official languages, even including other languages spoken in the EU, thereby benefiting **multilingualism, multilateralism** and **democracy**. Lastly, an appropriate legal and ethical framework is needed to ensure that, in its use of AI, public services uphold the highest **ethical standards**, meet the highest **data protection**, **security** and **ownership standards**, and provide **fair** and **inclusive access** to information in all official languages.