

**STOA**  
**Science and Technology Options Assessment**  
**STOA Panel meeting**

**Thursday, 16 February 2017, 09:30 - 11:00**

**LOW N1.4, Strasbourg**

**Minutes**

The meeting started at 09:36 with Paul RÜBIG, MEP and STOA Chair, in the chair. Mr RÜBIG was briefly absent and was replaced in the chair by Eva KAILI, MEP and First STOA Vice-Chair, for part of agenda item 3 and item 4.

**1. Adoption of the draft agenda**

- The Chair announced that interpretation was available in Bulgarian, Croatian, Czech, English, French, German and Italian and that the meeting was being web-streamed.
- The Chair announced that the Vice-President responsible for STOA for the second half of the legislative period would be Ramón Luis VALCÁRCEL SISO (EPP, ES). He would convene the constituent meeting of the STOA Panel when the committees had completed the appointment of their representatives on the Panel.
- The Chair took the opportunity to thank Mairéad McGUINNESS (EPP, IE) for the excellent collaboration in leading STOA during the first half of the legislative period.
- The Chair recalled that the draft agenda was in the dossier and, in the absence of any requests for changes or additions, announced that the agenda was deemed adopted without modification.

**2. Approval of draft minutes - STOA Panel meeting of 19 January 2017**

- The Chair informed the meeting that the draft minutes of the STOA Panel meeting of 19 January 2017 were in the dossier and asked Panel members if anyone wished to introduce any changes or additions.

**3. Presentation of the outcomes of the Technology Assessment study ‘Language equality in the digital age - Towards a Human Language Project’**

- The Chair gave the floor to Zsolt PATAKI, Head of Service responsible for the STOA Secretariat within the Scientific Foresight Unit (STOA), to introduce the study, which he had managed as administrator responsible.
- Mr PATAKI underlined that the study focussed on how technology could help to remove existing language barriers in the Digital Single Market (DSM), which particularly affected the less educated and older population, as well as people who spoke smaller and minority languages, thus creating a notable language divide. Language barriers have a profound effect on: (i) cross-border public services; (ii) fostering a common European identity; (iii) workers’ mobility; and (iv) cross-border e-commerce and trade, in the context of a DSM.
- He added that the study reviewed in detail the current status, trends and challenges of the European Human Language Technologies (HLT) sector. It paid attention to the economic impact of language barriers in Europe and the social implications of not having a balanced level of technological support for all European languages, and put forward policy options for effectively tapping the potential of these technologies in order to achieve a fully integrated European Union (EU) in the digital age. The study was carried out by iClaves, one of the STOA framework contractors, under a contract managed by the Scientific Foresight Unit (STOA).
- The Chair then welcomed the expert, Rafael RIVERA from iClaves, for a presentation of the outcomes of the study. Mr RIVERA explained that the study findings were based on five main ideas: the socio-economic implications of multilingualism in Europe; the current situation of HLT and future technological trends; the configuration of the European HLT industry; how HLT issues had been addressed in the past and current Information and Communication Technology (ICT) policies; launching a coordinated Human Language Project, including policies for Europe to develop and fully benefit from the next generation of HLT.
- He asserted that, with 28 official languages and more than 60 national, regional and minority languages, multilingualism hugely enriched cultural diversity in Europe. However, it was also one of the most substantial barriers for the creation of a truly integrated EU, seriously limiting cross-border commerce and business, workers’ mobility, provision of public services at the European level, and citizens’ participation in the political process.
- He said that using English as a *lingua franca* was not a solution, since more than 60% of the European population was excluded when using only English, with high disparities among countries: in Hungary, Spain, Portugal and Bulgaria more than 80% of the population was unable to speak English, compared to 20% in The Netherlands. In a multilingual scenario of the 6 majority languages in Europe (English, French, German, Italian, Polish and

- Spanish), still 15% of the European population would be left behind and in 11 European countries (Bulgaria, Czech Republic, Estonia, Finland, Greece, Hungary, Latvia, Slovakia, Slovenia, Romania and Portugal) more than half of the population would be unable to properly communicate using any of those languages.
- This language gap had strong social and economic consequences for the integration of migrants, workers' mobility, accessibility to public services and contents, cross-border e-commerce and international trade. The effect was particularly relevant for disadvantaged populations and Small and Medium-sized Enterprises (SMEs). The percentage of EU citizens who had ever moved to another EU country to live and work was only 5.8%. In a scenario of low language barriers between all EU countries, this would increase almost three-fold, up to 16.1%.
  - HLT were found behind many everyday digital products, since most of them used language to some extent. Some examples were mobile apps, social networks, translation systems and intelligent assistants. HLT were organised in three main segments: Intelligent Content, Speech Interaction, and Machine Translation. In fact, the emergence of new approaches, such as deep-learning neural networks, based on increased computational power and access to huge amounts of data were making HLT a real solution to overcome language barriers. Most improvements in HLT relied particularly on the ability to access and maintain ever larger and more finely tuned linguistic data. Lack of access to that data would constrain the development of HLT. But the level of digital support and data for the different languages was very uneven. For most of European languages it was “non-existent” or “weak” at best, and it could lead to the digital extinction of many European languages.
  - The Internet ecosystem was dominated by non-European giant companies, mainly from the United States (US), and this had negative consequences for small languages. As far as the industry was concerned, there were around 500 European companies related to HLT. A quarter of them were micro-enterprises with fewer than 10 employees, while only 6% had more than 200 employees. Almost the entire industry was composed of SMEs. Europe had a long-standing Research and Development (R&D) tradition with over 800 centres performing scientific and technological research on European languages. The EU had funded successful projects, such as EuroMatrix and Moses, the open source machine translation software, which had been mainly developed in European research projects. However, it had failed, for the most part, to stimulate the European industry to invest in HLT.
  - Many European HLT companies had been acquired by larger companies, mainly American, which completed their portfolio of products and services by acquiring small innovative start-ups. Europe tended to pursue isolated research activities. The European HLT community acknowledged a lack of coordination between research efforts and the market of HLT applications and services. Therefore, Mr RIVERA suggested that solving this issue required: (i) a strong coordination of the different initiatives; (ii) means to increase efficiency by sharing knowledge, infrastructure and resources; and (iii) scaling-up the European companies.
  - However, the analysis of ca. 3,000 technical, political and strategic documents of the EU Institutions through text mining techniques gave disappointing results, as ‘language technology’ was an irrelevant topic compared to others (such as e-Government, cloud computing, smartphones, wearables, Internet of Things, smart cities, big data, machine learning or open data) and the gap was increasing. Mr RIVERA proposed launching a multidisciplinary European *Human Language Project (HLP)*, including a set of policies involving stakeholders from the public sector, civil society, research institutions and the industry at the European, national and regional levels, in a coordinated and joint effort to move Europe into a lead position in this field.
  - He said that research in Europe should focus on creating a new paradigm of HLT, combining a fresh look at linguistics with the power of current Artificial Intelligence (AI) methods that are based on vast knowledge bases, themselves created with the help of sophisticated HLT. Talent scarcity and drain brain should be transformed into talent creation and brain gain. Resources for the industry should be provided in a seamless, open and effective way through existing European platforms. The public sector should provide contents and services for all European languages, while promoting the growth of the HLT market through public procurement of innovative technology. Mechanisms to facilitate the scaling-up of European innovative HLP companies should be promoted. Eventually, policies supporting firms across Europe to sell cross-border by providing their contents, products and services in the different European languages, should be enacted to create a fully integrated DSM.
  - Mr RIVERA summarised the main conclusions of the study by reiterating that language barriers in Europe had strong social and economic consequences. Nevertheless, HLT were giving Europe the opportunity to break these barriers, while seizing the great opportunities of multilingual Europe in the digital age. However, uncoordinated (and poorly funded) research institutions and fragmented European industry were not able to effectively respond to this challenge. Moreover, these technologies were not properly reflected in current ICT policies of the EU. To change this situation, several policies for a European HLP were proposed and assessed:

- Refocusing and strengthening research in HLT to set up, under the umbrella of the HLP, a large-scale, long-term R&D and investment funding programme, in which basic research, applied R&D, as well as innovation and commercialisation, work closely together, in order to develop technologies for Deep Natural Language Understanding by the year 2030.
- Promoting the European HLT Platform of data and services to draw upon existing infrastructures and platforms to foster an open cloud-based architecture, enabling the sharing and further development of HLT-related resources developed at different European levels.
- To bridge the technology gap between European languages to foster the technology development for European languages other than English, particularly the smaller ones or less-resourced ones, and also on language preservation through digital means.
- Following the presentation, the Chair gave the floor to interested Members for questions / discussion.
- Algirdas SAUDARGAS, MEP, noted that English was currently the *lingua franca* in Europe and suggested that language technologies should not replace human interpreters and translators. He asserted that it was necessary to stimulate the European Commission to react to this STOA study and that, already in this term of the European Parliament (EP), the HLP would become a reality. He drew parallels between a hypothetical HLP and the Human Brain Project, pointing out that Google were using deep learning in their language technologies, and that the Human Brain Project had a platform of neural networks. He suggested that these networks be used for language technologies to save money. He finally expressed his gratitude to STOA for commissioning the study and the hope that the EP could make the HLP a reality.
- Jan Philipp ALBRECHT, MEP and STOA Panel member, expressed his support for this kind of technology, which was essential for the EU, especially for communication, not only between market actors, but also between citizens, with a technology like Siri showing its real potential. He asserted that huge funds should be invested into the development of HLT. He asked whether there were already practical examples showing whether these technologies worked, or possible ways to try and test these technologies to see whether they worked as hoped. He pointed out that, when it comes to new technologies, there was often hype that was never fully realised.
- Asking for the floor, Lionel SOLA, Policy Officer responsible for EP outreach with the ‘Policy Implementation and Planning’ unit in the European Commission’s DG CONNECT, recognised the potential of language technologies to lower language barriers in Europe, with the potential to ensure the respect of cultural diversity and have a big societal and economic impact, especially in the DSM and e-commerce. He said that the Commission recognised the role of research and innovation for language technologies and took note of the need for support. He announced that the Commission would carefully study and follow up on the conclusions of the STOA study, while remaining available for any collaborative work with STOA Panel members.
- Mr RIVERA asserted that new HLT were badly needed and many companies were working on it. He implied that the EU might prefer European companies to do this work rather than Google. He noted that computational translations were already of similar quality to human translations, and that there were many examples of these technologies working in practice, such as Siri and Cortana. Chinese e-commerce companies were already using language technologies to translate their websites into other languages. He asserted that big companies like Google were investing in language technologies, because they saw them as the future. He postulated that in a few years people would have devices that were able to translate from one language to another. These technologies were practically already at work, such as in Skype conference calls, which was not possible a few years ago. In his view, these technologies were an opportunity for everyone in the EU institutions and Europe in general.
- The Chair announced that, as there were no objections, the study would be published on the STOA website and widely distributed within and outside the Parliament.

#### **4. Ongoing and new STOA projects**

- The Chair informed Members that all ongoing STOA projects were running to schedule. In particular:
  - The study on ‘*Language equality in the digital age*’ would be published in the coming weeks.
  - The Scientific Foresight project ‘*Assistive technologies for the inclusion of people with disabilities in society, education and jobs*’ was in its final phase; an expert workshop was held in Brussels on 31 January 2017 to explore social, political, technological and other aspects of the development of assistive technologies towards 2050; the project was in the scenario development phase and was due to finish on time, in April 2017.

- The Scientific Foresight study *‘Additive bio-manufacturing: 3D printing for medical recovery and human enhancement’* continued as scheduled: Phase 1 was due for completion in April 2017 and Phase 2 in February 2018 (end of the project).
- With the support of the European Parliamentary Research Service (EPRS), STOA had produced an animated infographic to guide Members through the findings of STOA's Scientific Foresight study on robotics (*‘The Ethics of Cyber-Physical Systems’*, published in 2016). As STOA considered developing similar infographics for a selection of future projects, Members were encouraged to send their feedback to the STOA Secretariat.
- The EP's Scientific Foresight approach was being evaluated by the Scientific Foresight Unit (STOA), based upon the first two studies completed (*‘Ethics of Cyber-Physical Systems’* and *‘Precision Agriculture and the future of farming in Europe’*). An updated publication on the methodology was in preparation.
- A horizon scanning of techno-scientific trends, with possible implications for European policy, was being conducted with the support of an external contractor, to generate a neutral and useful input, with a selection of relevant trends, aimed at helping Panel members decide on future STOA studies. Most controversial fields were to be identified within the investigated trends, due to their likely relevance for EU policy-making.
- A new STOA project was launched earlier that week, entitled *‘Challenges and opportunities of establishing a sovereign and trustworthy ICT industry in the EU’*, attempting to identify and assess specific policy options for the EU to achieve cyber-resilience and develop capabilities, and industrial and technological resources, for a trustworthy EU cyberspace, with a view to promoting core values, such as online privacy protection.
- The Chair announced that as there were no objections the projects would continue to be implemented as described.

## 5. STOA Annual Lecture 2017

- The Chair invited Members to continue the discussion that started at the last Panel meeting on the subject of the STOA Annual Lecture 2017, so that a tentative decision could be taken that day, to be confirmed by the Panel when it would be newly constituted.
- The Chair reminded Members of his proposal, made at the last Panel meeting, that in 2017 the Annual Lecture should focus on science media communication and the development of a European Science Media Hub, with, among others, high-level speakers from Elsevier and AAAS<sup>1</sup>, and, if possible, a Nobel Prize winner or a renowned journalist active in science communication. He informed Members that exploratory contacts, for the purpose of checking the availability of potential speakers, had been initiated by the Secretariat with Elsevier and AAAS.
- He then reported that, as possible dates for the Annual Lecture 2017, the STOA Bureau has identified 21 November, 6 December and 22 November, in this order of priority, with the final choice depending on the availability of the keynote speaker(s).
- The Chair finally announced that, as there were no objections, preparations will continue along these lines.

## 6. STOA workshops and joint activities with external organisations

### 6.1. Forthcoming events

- The Chair referred Members to the table of forthcoming STOA events in the dossier.

### 6.2. STOA workshop on ‘The future of science through citizens’ engagement’ (with TA SWISS), 28 March 2017, EP, Brussels

- The Chair explained that preparations for the workshop were running to schedule. This event was being organised in cooperation with TA-SWISS, STOA's Swiss counterpart, and would explore how citizens could be more involved in shaping the scientific agenda.
- The Chair announced that, as there were no objections, the preparations would proceed as described.

## 7. Visits / External activities

### 7.1. STOA delegation to the AAAS Annual Meeting, 17-21 February 2017, Boston

- The Chair recalled that he would intervene as discussant in a session organised by the Joint Research Centre (JRC) and entitled *‘Making sense of an abundance of knowledge to inform policy-making’* on Saturday, 18 February 2017, 3:00 p.m. – 4:30 p.m., and Ms KAILI would be discussant in a session organised by the European

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<sup>1</sup> American Association for the Advancement of Science

Commission's Scientific Advice Mechanism (SAM) and entitled '*Scientific Advice Mechanisms for Policy*' on Saturday, 18 February 2017, 8:00 a.m. – 9:30 a.m.

- The Chair further explained that, between the two sessions, the Members would participate in a meeting with Koji OMI, Founder and Chairman of the Science and Technology in Society (STS) *forum*. Then they would meet AAAS Chief Executive Officer (CEO) Rush HOLT and AAAS President-elect Susan HOCKFIELD, former President of the Massachusetts Institute of Technology (MIT). A further meeting was being organised with Her Royal Highness Sumaya bint EL HASSAN, President of the Royal Scientific Society of Jordan and Champion of World Science Forum 2017, due to take place in November 2017 in Amman.
- For Monday, 20 February 2017, which is a public holiday in the US (G. Washington Day), it was still possible to organise a series of visits/meetings at the MIT Internet Policy Research Initiative (IPRI), the MIT Computer Science and Artificial Intelligence Laboratory (CSAIL), the Akamai Network Operations Command Center (NOCC), the MIT Martin Trust Center for Entrepreneurship and the Cambridge Innovation Center (CIC). There would also be a possibility to visit the software development and marketing company HubSpot.
- Tuesday, 21 February 2017, would begin with a guided tour of the MIT Media Lab, followed by discussions with relevant researchers about blockchain technologies, the ethics of artificial intelligence, and 'biomechatronics', the interdisciplinary study of biology, mechanics, electronics and control. This would be followed by a roundtable lunchtime meeting at the Belfer Center for Science and International Affairs at Harvard University.
- The Chair announced that, as there were no objections, the preparations for the delegation will continue and be completed along the lines described.

#### **8. Any other business**

- The Chair asked if there were any issues Members would like to raise or discuss.
- Carlos COELHO, MEP and STOA Panel Member, informed Members that, in January 2017, the Portuguese version of the EPRS study '*Ten technologies which could change our lives*' was launched in Lisbon. At an event with Commissioner Carlos MOEDAS a network of more than 70 Portuguese scientists was then inaugurated.

#### **9. Date and place of next meeting**

- The Chair announced that the next Panel meeting was scheduled for Thursday, 16 March 2017, at 9:30 a.m. in the same room (LOW N1.4) and would feature a presentation by the European Medicines Agency (EMA).

The meeting ended at 10:28.

### **ANNEX** **List of participants**

#### STOA Panel members:

Mr Rübig, Ms Kaili, Mr Tošenovský, Mr Albrecht, Mr Coelho, Ms Delvaux, Mr Grzyb, Mr Nekov, Ms Schmidt.

#### Other Members:

Ms Giménez Barbat, Mr Saudargas.

#### Scientific Foresight Unit (STOA):

Mr Karapiperis, Mr Pataki, Ms Van Woensel, Mr Evrard, Ms Manirambona.

#### Other participants:

Mr Hiller (EPRS), Mr Sola (EC), Mr Seltz (Euroscience), Mr Rivera (iClaves) Ms Grahek (JRC), Mr Schwendinger (Assistant to Mr Rübig).