

Fostering the Next Generation of European Language Technology: Recent Developments – Emerging Initiatives – Challenges and Opportunities

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Abstract

META-NET is a European network of excellence, founded in 2010, that consists of 60 research centres in 34 European countries. One of the key visions and goals of META-NET is a truly multilingual Europe, which is substantially supported and realised through language technologies. In this article we provide an overview of recent developments around the *multilingual Europe* topic, we also describe recent and upcoming events as well as recent and upcoming strategy papers. Furthermore, we provide overviews of two new emerging initiatives, the CEF.AT and ELRC activity on the one hand and the Cracking the Language Barrier federation on the other. The paper closes with several suggested next steps in order to address the current challenges and to open up new opportunities.

Keywords: Multilinguality, LR National/International Projects, Infrastructural/Policy issues, LR Infrastructures and Architectures

1. Introduction

A truly multilingual Europe, which is supported through sophisticated Language Technologies (LT) is still far from being a reality. Since its inception in 2010, it has been one of the key goals of META-NET to foster and stimulate research and technology development towards this scenario. Important milestones along the way were the publication of the META-NET White Papers (Rehm and Uszkoreit, 2012; Rehm et al., 2014) and the Strategic Research Agenda for Multilingual Europe 2020 (SRA) (Rehm and Uszkoreit, 2013) as well as the deployment of META-SHARE (Piperidis, 2012; Piperidis et al., 2014). While all these activities did have a certain amount of impact in various European countries (Rehm et al., 2016b), new challenges and new opportunities have been emerging in the last two years. In this paper we¹ provide an overview of the most recent developments around META-NET and the topic of multilingual Europe (Section 2.). We describe two new emerging initiatives that are becoming increasingly important for the community (Section 3.). The main current challenges and opportunities are sketched in Section 4. while Section 5. concludes with several suggested next steps.

2. Recent Developments

In the following subsections we briefly describe recent developments, starting with a brief overview of META-NET and its key goals.

2.1. META-NET – A Brief Overview

Our multilingual European society imposes societal challenges on political, economic and social integration and inclusion, especially in the creation of the Digital Single Market (DSM) (EC, 2010). LT will bring us closer to

¹On behalf of the members of the META-NET Executive Board: Sophia Ananiadou, Núria Bel, António Branco, Koenraad De Smedt, Josef van Genabith (Deputy Chair), Marko Grobelnik, Jan Hajič (Chair), Monica Monachini, Stelios Piperidis, Georg Rehm (Network Manager), Mike Rosner, Tamás Váradi, Andrejs Vasiljevs (Deputy Chair) and François Yvon.

this goal. It is the key enabler to boosting growth and strengthening our competitiveness. Recognising Europe's demand and opportunities, 60 research centres in 34 European countries joined forces in META-NET, a European Network of Excellence dedicated to the technological foundations of a multilingual, inclusive and innovative European society.² META-NET was partially supported through four EU-projects (T4ME, CESAR, METANET4U, META-NORD, 2010–2013); currently, the project CRACKER³ (2015–2017) supports selected META-NET activities such as, among others, META-FORUM 2015, 2016 and 2017. One of META-NET's key goals is mono-, cross- and multilingual technology support for all European languages as well as fostering innovative research by providing strategic guidance and recommendations with regard to a small number of priority research topics (Rehm and Uszkoreit, 2013).

2.2. The Digital Single Market and our Open Letter Campaign

In early 2015, preceding the Riga Summit 2015 (see Section 2.4.), it transpired that the EC's DSM Strategy would most probably *not* contain a dedicated language or multilingualism topic – even though we had already indicated in our SRA (Rehm and Uszkoreit, 2013) that a truly unified Digital *Single* Market can only exist when language barriers have been overcome through LT. This is why we organised, in March 2015, an online open letter campaign, urging the EC to take a dedicated language topic into account for the final version of the DSM strategy, expected for early May 2015.⁴ Within a few days the open letter campaign managed to collect more than 3000 signatures including those of researchers, professors, industry professionals, translators, administrators, officials and several Members of the European Parliament (also see Section 2.5.).

²<http://www.meta-net.eu>

³<http://www.cracker-project.eu>

⁴<http://multilingualeurope.eu>

2.3. Addressing Community Fragmentation

Parallel and complementary to META-NET, several stakeholder groups have been investing a lot of time and resources in organising events and awareness-raising activities, developing roadmaps and strategies and communicating to key decision makers with regard to specific aspects of the overall topic of Multilingual Europe (including, but not limited to, language learning, industry and innovation, minority languages etc.).

In some of these areas, good cooperations and collaborations could be established, as some stakeholders invited other stakeholders to their events, often on a recurring basis. A certain amount of community building has indeed successfully taken place, also due to META-NET activities such as the META-FORUM conference series. However, to non-initiated outsiders, the wider community around the *Multilingual Europe* topic still appears to be very much fragmented. This is, unfortunately, still a rather severe issue and also a challenge, especially when the mutual goal of all stakeholders is to communicate complex messages and suggested solutions such as roadmaps and strategy papers, to administrators, politicians and other key decision makers.

2.4. META-FORUM 2015 and Riga Summit 2015: A Turning Point

The Riga Summit 2015 on the Multilingual Digital Single Market (April 27-29) was the first tangible indicator that a wider group of stakeholders had finally reached a turning point in terms of initiating a collaboration towards a common goal.⁵ At the Riga Summit, consisting of META-FORUM 2015, the Riga Summit Plenary Day, the Multilingual Web Workshop 2015 and the CEF.AT/ELRC Conference, about 350 participants of several communities came together and prepared as well as signed, on the final day, a one-page document, the *Declaration of Common Interests* (Riga-Declaration, 2015).⁶ In this Riga Declaration, 12 organisations⁷ state that they stand united in their goal and interest to

- support multilingualism in Europe by employing language technology in business, society and governance to create a truly Multilingual Digital Single Market,
- exchange and share information in their efforts to promote their goals and interests at local, national and European levels,
- raise awareness in society at large using channels available to their associations, alliances and societies.

Furthermore, the establishment of a Memorandum of Understanding among the 12 organisations is foreseen with the goal of forming a “Coalition for a Multilingual Europe”.

⁵<http://rigasummit2015.eu>

⁶The Riga Summit 2015 was jointly organised by META-NET (through the project CRACKER), LT-Innovate (through the project LT_Observatory), Tilde and the European Commission.

⁷BDVA, CITIA, CLARIN, EFNIL, ELEN, ELRA, GALA, LT-Innovate, META-NET, NPLD, TAUS, W3C.

2.5. The Strategic Agenda for the Multilingual Digital Single Market

Building upon past activities, in particular the META-NET SRA (2013), the two EU-projects CRACKER (Rehm, 2015) and LT_Observatory prepared the Strategic Agenda for the Multilingual Digital Single Market (SRIA, 2015).

Here, we can only provide a brief summary: the setup of the large and ambitious strategic programme towards the MDSM consists of three layers. On the top layer we have a set of focused Technology Solutions for Businesses and Public Services. These innovative application scenarios and solutions are supported, enabled, and driven by the middle layer which consists of a small group of Services, Infrastructures and Platforms that provide, through standardised interfaces, data exchange formats and component technologies, various services for the translation, analysis, production, generation, enrichment and synthesis of language. The bottom layer connects the infrastructures to innovative Research Themes. These provide concrete scientific results, approaches, technologies, modules, components and algorithms that can then be used to enable the second and, ultimately, the top layer.

The SRIA was delivered to EC Vice President Andrus Ansip and other high-ranking EC officials; all EC Commissioners and their cabinets received the document via email; a written response was received on 8 June 2015. The letter, addressed to the Network Manager of META-NET, takes into account our awareness-raising campaign and the *Resolution* and *Declaration* documents prepared in Riga. VP Ansip thanks the community for bringing to his attention the open letter campaign and the SRIA. Furthermore, VP Ansip invites “the European [LT] community to further develop the ideas presented in the draft Strategic Agenda for the multilingual Digital Single Market”.

2.6. The ICT-17 Group of Projects

At the beginning of 2015, six new EU-funded projects were launched, supported by the call Horizon 2020, ICT-17, titled “Cracking the language barrier”.⁸

One of the key goals behind this call was to foster innovation and technology support especially for those languages that the META-NET White Papers evaluated as having only moderate or even worse technology support. While the sheer existence of this call and the resources provided by the EC can be considered a step in the right direction, the available resources are too small to initiate a major paradigm shift and breakthrough in MT research or highly innovative and disruptive application scenarios.

A major goal of the project CRACKER is fostering community building around this group of projects. The start of this community building activity coincided with the Riga Summit where a first meeting of the ICT-17 group of projects and several related FP7 projects was held. Later on it was decided to significantly extend the scope of this emerging community by not only including (ICT-17 and FP7) projects but also longer-term and more sustainable organisations in the emerging initiative (see Section 3.2. for more details).

⁸One Research and Innovation Action, three Innovation Actions and two Coordination and Support Actions.

3. Emerging Initiatives

Two emerging initiatives in the area of *multilingual Europe*, briefly described in the following two sections, are currently conducting valuable activities and contributing important results to multilingual Europe.

3.1. Connecting Europe Facility – Automated Translation (CEF.AT)

CEF Digital Service Infrastructures (DSIs), funded through the CEF programme, will provide services to support the development of the European DSM. They focus on pan-European online public services. The emerging Automated Translation platform (CEF.AT) is one of its key building blocks. Three EC General Directorates (DGT, DG CNECT, DG DIGIT) lead the deployment of CEF.AT, starting from the operational service MT@EC, built around the Open Source MT platform Moses, partly funded by the EC through multiple research projects such as EuroMatrix, EuroMatrixPlus and MosesCore.

The EC has contracted the European Language Resource Coordination consortium (ELRC) to work jointly with the Member States, Iceland and Norway to identify and collect language resources for all 24 official EU languages and the two CEF-affiliated languages, for the purpose of the CEF.AT platform.⁹ ELRC has a runtime of two years (May 2015 until April 2017).

3.2. The Cracking the Language Barrier Initiative

The Cracking the Language Barrier initiative is a federation of projects and organisations working on technologies for a multilingual Europe (Rehm, 2016).¹⁰

Instead of building a smaller community around the ICT-17 projects (see Section 2.6.), the EU project CRACKER decided to fill the gap described in Section 2.3., i. e., to create one umbrella initiative that includes all currently running and recently completed EU-supported projects and, in particular, all stakeholder organisations. Instead of the term “coalition”, as initially suggested in the Riga Declaration (Riga-Declaration, 2015), we opted to use the term “federation” to emphasise that this is an initiative *from* the community *for* the community. One of the main principles is that all members have equal rights and equal say.

As the initiative is a direct follow-up activity to the Riga Declaration, we intend eventually to assemble under the roof of this new initiative at least all 12 organisations that signed the Riga Declaration. We selected the federation’s name based on the name of the call Horizon 2020, ICT-17¹¹ as it was not considered necessary to invent a new community brand. The objective of “cracking the language barrier” (or working with or on multilingual or crosslingual technologies) can be considered the shared strategic goal that all participating organisations and projects firmly stand behind. Additional organisations and projects have been approached for participation in the initiative. The group of members is

constantly growing. The Cracking the Language Barrier initiative is meant to be a self-organising federation of projects and organisations that share a common strategic objective. It is currently not foreseen to establish a governance structure.

3.2.1. Memorandum of Understanding

The federation is set up around a short multi-lateral Memorandum of Understanding (MoU), see (CTLB-MoU, 2015). As it is stated in the MoU, its purpose is “to establish one umbrella initiative for all projects and organisations working on or supporting the idea of cracking the language barrier. The MoU contains a non-exhaustive list of general areas of collaboration [see section 3.2.4. below]; all projects and organisations that sign this document [...] are invited to participate in these collaborative activities.”

An interested European project or organisation can join the initiative by signing this multilateral MoU. By signing, a project or organisation declares its intent for cooperation and collaboration according to the non-exhaustive general areas of collaboration listed in the MoU.

The idea is to establish an umbrella initiative, a federation of projects and organisations that support or contribute to the mutual strategic objective. Participation is optional and open to any European project or organisation working on or with crosslingual or multilingual technologies, in neighbouring areas or on related topics.

3.2.2. Current Members

At the time of writing, the MoU has been signed by 10 organisations and 23 projects (including service contracts):

- *Organisations:* CITIA, CLARIN, ELEN, EFNIL, GALA, LT-Innovate, META-NET, NPLD, TAUS, W3C.
- *Projects:* ABUMATRAN, CRACKER, DLDP, ELRC, EUMSSI, EXPERT, Falcon, FREME, HimL, KConnect, KRISTINA, LIDER, LT_Observatory, MixedEmotions, MLI, MMT, MultiJEDI, MultiSensor, PHEME, QT21, QTLeap, SUMMA, XLiMe

Additional organisations and projects have been approached for participation in the initiative. The group of members is constantly growing.

3.2.3. Communication Channels

An initial website for the initiative was launched in August 2015. The key idea behind the website is to present each project and organisation participating in the initiative with at least one page. This way the initiative itself can be established as one overarching brand and activity without undermining the importance and status of the participating projects and organisations. Figure 1 shows the current landing page of the Cracking the Language Barrier website (March 2016). Figure 2 shows an example organisation page, Figure 3 shows an example project page. These examples illustrate that each organisation and project is presented with a brief description, further details, contact information and a link to their own website. The first event organised under the Cracking the Language Barrier brand is the LREC 2016 workshop “Translation evaluation – From fragmented

⁹<http://lr-coordination.eu>

¹⁰<http://www.cracking-the-language-barrier.eu>

¹¹<https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/289-ict-17-2014.html>

tools and data sets to an integrated ecosystem” (Rehm et al., 2016a), jointly organised by the projects CRACKER and QT21 (see Figure 4).¹² Furthermore, the website contains a calendar and a section on which shared documents such as the Riga Declaration (Riga-Declaration, 2015) or the Multilingual Digital Single Market SRIA (SRIA, 2015) are made available for download. Additional content and features are planned (e. g., a joint internal document repository, a joint newsletter, a joint blog).



Figure 1: The landing page of the Cracking the Language Barrier initiative’s website

Additionally, email distribution lists were set up in order to streamline communication and coordination between the participating projects and organisations (e. g., to announce

¹²<http://www.cracking-the-language-barrier.eu/mt-eval-workshop-2016/>



Figure 2: An example organisation page (NPLD)



Figure 3: An example project page (HimL)

workshops, conferences, evaluations etc.). Any project or organisation that signs the MoU is added to the email list with as many representatives as they like.

3.2.4. Areas of Collaboration

At the meeting of all European projects funded through Horizon 2020, call ICT-17, on April 28, 2015, in Riga, sev-



Figure 4: The website of the LREC 2016 Workshop “Translation evaluation – From fragmented tools and data sets to an integrated ecosystem”

eral areas of collaboration were discussed and agreed upon. The following list contains some of these areas of collaboration.

External communication and dissemination: all projects and organisations participating in the activity are invited to collaborate on events, publications and scientific dissemination, for example, by participating in each others’ events, evaluation campaigns, shared evaluation workshops, by actively using and promoting the “Cracking the Language Barrier” activity in dissemination emails, posters, presentations, panel discussions, publications, by exchanging and harmonising communication plans.

Data management and repositories for data, tools and technologies: all projects and organisations participating in the activity are invited to join forces and to collaborate on harmonising data management plans (metadata, best practices etc.) as well as data, tools and technologies distribution through open repositories.

Strategic Research and Innovation Agenda: projects and organisations are invited to collaborate by providing input and feedback with regard to the current and any upcoming versions of the Strategic Agenda for the Multilingual Digital Single Market (SRIA version 0.5 published at the Riga Summit in April 2015, see (SRIA, 2015)) or related strategic documents such as, for example, roadmaps.¹³

Shared tasks and evaluations: projects and organisations are invited to participate in the shared evaluation workshops organised by CRACKER and QT21, among others, such as, for example, WMT and IWSLT.

¹³The preparation of the Strategic Agenda for the MDSM is coordinated by the two projects CRACKER and LT_Observatory.

3.2.5. Invitation

While the Cracking the Language Barrier federation is still at its very beginning, the development of its membership base is already very promising and shows a growing interest among all stakeholders to achieve more by working together instead of in isolation or without broader coordination. We would like to invite interested organisations, projects and any other stakeholders with an interest in the topic of multilingual Europe to get in touch with us regarding active participation in the Cracking the Language Barrier initiative.

4. Challenges and Opportunities

With the publication of the Horizon 2020 Work Programme 2016/2017 the EC has, unfortunately, dropped LT as a stand-alone topic; however, LT is included in ICT-14 where it is foreseen as an enabling technology for crosslingual data value chains.¹⁴ In addition, neither language nor multilingualism are reflected in the EC’s DSM strategy, published in May 2015. One of the next important steps is, therefore, to significantly increase our communication activities – not only with regard to the EU and EC but also to the governments and administrations of Member States and other European countries – and to collaborate towards an updated version of the MDSM SRIA. A key idea is to prepare, publish and endorse the next version of the SRIA not only by a few EU projects but by the whole multilingual Europe community, as assembled in the Cracking the Language Barrier federation. With enough substance in terms of strategies, technology solutions and innovative research topics as well as with the collective weight and support of all involved communities and as many countries as possible, we may be able to establish LT as an important component in the EC’s DSM strategy and to re-establish it in the Horizon 2020 Work Programme 2018-2020.

5. Summary, Conclusions, Next Steps

Since 2012 we have been arguing that the Digital Single Market (DSM) will remain a set of isolated markets if multilingualism is not reflected properly. Unfortunately, the DSM Strategy, published by the EC in early May 2015, does not contain the language topic as a core component. At the same time, LT, especially MT, has, by now, a certain amount of political visibility through the Riga Summit 2015, META-FORUM 2015, the open letter campaign and CEF.AT. We also witness an intense uptake of LT in our day-to-day IT infrastructure, from interactive systems in connected devices to the Internet of Things and mobile phones, among others. Many of the current innovations have their roots in European research activities, but most of them are currently deployed by SMEs or larger enterprises on other continents.

LT, including closely related methods such as Deep Learning, is experiencing an unprecedented period of rapid growth and uptake while the EC has been demoting the topic

¹⁴According to a general paragraph about the inclusion of language technologies in the introduction of the Horizon 2020 ICT Work Programme, LT can also be foreseen in proposals submitted to ICT-15 and ICT-16, even though this is not explicitly mentioned in the calls themselves.

in the Horizon 2020 ICT Work Programme 2016/2017: LT is no longer its own research topic. Nevertheless, LT is mentioned in the Big Data call H2020-ICT-14 as an enabler for crosslingual data value chains (see Section 4.).

While the META-NET SRA (Rehm and Uszkoreit, 2013) has had a certain impact in several European countries (Rehm et al., 2016b), the MDSM SRIA (SRIA, 2015) unfortunately has not managed to influence the key decision makers yet but it raised the visibility and awareness regarding the need for a *multilingual* DSM.

Now that LT is getting increasingly more attention and uptake globally and, at the same time, less attention on the European level, there is an urgent need for the larger LT community to act. There is also a need to think about what the European perspective is and if the European LT community can find unique selling propositions that distinguish itself, for example, by providing approaches and solutions for current societal European topics, see, for example, the EC's list of Societal Challenges underlying Horizon 2020.¹⁵ Two examples: enabling communication with refugees through smart translation assistants; enabling the easy consumption of large amounts of data, collected all over Europe in multiple languages, through text generation.

The next window of opportunity on the European level is the Horizon 2020 ICT Work Programme 2018-2020. The discussion around its core topics has already started in the first half of 2016, which means that the community's next steps need to be planned now. The European LT community needs to define its priorities, goals, key topics, and solutions – not only with regard to the DSM, but also beyond, on a broader and more general level. In terms of the next steps we suggest, among others, increased and coordinated collaboration among all stakeholders groups; the emerging Cracking the Language Barrier federation is a suitable platform. A substantial update of the MDSM SRIA to Version 0.9 is needed with a stable version to be ready by META-FORUM 2016 (4/5 July in Lisbon, Portugal).

It is of utmost importance, parallel to the technologically rather focused MDSM SRIA update, for META-NET also to collect new visionary ideas beyond applications and solutions for the DSM, i. e., fresh ideas that establish bridges to neighbouring scientific fields such as cognitive science, cognitive computing, machine learning, linked data, brain research, psychology and digital humanities, among others, but also to important IT topics such as, for example, robotics, Internet of Things, smart manufacturing, smart cities and personalised medicine; closely connected is the relationship between LT research and the European startup scene, which needs to be further strengthened. To this end, we suggest to update and to reorganise the Priority Research Topics published in the META-NET SRA (Rehm and Uszkoreit, 2013) and to synchronise them, in the medium to long run, with more recent initiatives such as the Big Data Value SRIA and the CITIA Roadmap to identify synergies, technological gaps and, along the way, new opportunities. A big challenge is to consolidate the multiple different 'LT clouds' suggested by different stakeholders. In this regard, one common approach and, ideally, brand, needs to be

agreed upon and then established, especially through consistent and sustainable use in external communication.

An important activity for our field is CEF.AT, which is to be further supported and tightly integrated into our strategic plans due to its importance for the task of awareness raising and informing key decision makers about the capabilities of modern Language Technologies.

A closely related challenge is to foster technology development for those languages that are only marginally supported through LT in order to avoid digital language extinction.¹⁶ To this end, dedicated bridges need to be established for faster knowledge and technology transfer.

The success of the open letter campaign shows that it may be possible to organise a far-reaching viral campaign around the language topic, aimed at the public at large, in order to get the European citizen on board as additional leverage regarding their national politicians and the EP.

To mention a final next step, the European LT community needs to find a way to showcase their technologies, innovations and success stories (new companies, research breakthroughs etc.), originally funded with EC resources. To this end, a marketing and PR strategy is needed.

In order to enable the wider European LT community actually to move itself into the position to be able to foster the next generation of European LT, all related stakeholders need to work closely together. An essential step is the preparation of a convincing, realistic, yet visionary research and innovation strategy that includes solutions for the Multilingual Digital Single Market. In addition, visionary medium to long-term research and application scenarios need to be conceptualised and specified that are not yet possible to be implemented, but that will have an impact on the future IT infrastructure of Europe and of the whole planet.

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¹⁵<https://ec.europa.eu/programmes/horizon2020/en/h2020-section/societal-challenges>

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