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Europe and the Global AI Race

State actors increasingly regard Artificial Intelligence (AI) as a key technology and a strategic resource. How are Europeans, in particular France and Germany, positioning themselves in the context of a global race for the supremacy in AI? Europe is proposing a model in which AI developments and applications are better regulated and ethically grounded.

By Fabien Merz

Due to its potentially extremely versatile applications and its disruptive nature, AI is touted as the "new electricity". For example, the business and strategy consulting firm McKinsey predicts that AI could generate an additional economic output of around 13 trillion USD by 2030, which would add about 1.2 per cent to the global GDP every year. It is safe to assume that AI will not only contribute significantly to economical and societal prosperity, but also play a significant role in the fields of national security and warfare.

Advances in the field of AI do not only bring opportunities but are also fraught with risks and open questions. For society at large, these include the transformation of labor markets and the attendant socio-economic implications, access to and handling of data, and related issues of data privacy as well as ethical questions relative to transparency, explicability and accountability of AI-generated outputs. In the field of security and foreign policy, questions arise in relation to global inequality, amongst other things. Thus, AI could, for example, further aggravate the military and economic disparity between the stronger and the weaker economies and their societies.

Accordingly, more and more states are anticipating the far-reaching impact that AI

French President Emmanuel Macron presents the French AI strategy in Paris, March 29, 2018. *Etienne Laurent / Reuters*

will have on the economic and political power structure and are therefore striving to secure an advantageous starting position in this area. Around 30 states have already elaborated national AI strategies aimed at making the best possible use of the opportunities associated with AI while mitigating the impact of its negative externalities. Additional states have announced such strategies. It is notable that the approaches and priorities of these strategies at times vary significantly. Certain strategies focus on one or more subareas, such as support-

ing research and fostering talents. Others focus on support for the private sector and industrial policy, while still others pursue a holistic approach ranging from industrial policy and research funding to data access and handling ethical considerations as well as actively shaping international AI norms.

While the US has not defined an overarching national AI strategy, it remains by most metrics the global leader in this field. It is estimated that nearly 40 per cent of the global venture capital available in AI and

nearly half of the start-up companies active in the field worldwide are associated with the US market. In addition, the US is the undisputed leader in transferring research into practical and commercial applications. This is due, among other factors, to the well-established cooperation structures between government, research and private-sector actors, the existence of an AI ecosystem, as well as indigenous tech giants such as Alphabet, Facebook, or Amazon that are very active in the area of AI.

However, recently global competition for AI dominance has arisen between the US and an emergent China. The latter is still trailing behind the former in terms of quality AI research and education, the number of active AI start-ups, as well as in the area of internationally competitive patents. However, in its AI strategy presented by the Chinese state in 2017, the Next-Generation Artificial Intelligence Plan, the country seeks to catch up with the US by 2020, to overtake it by 2025, and to become the global leader in AI by 2030 (see CSS Analysis No. 220).

But where does the European continent stand in terms of this global competition for AI dominance? What is the EU doing to avoid falling behind with respect to this key technology? Which positions have the two economic powerhouses on the European continent, France and Germany, adopted on this matter? The present analysis will focus on their respective starting positions and describe the substance of the respective European, French, and German AI strategies. In doing so, it will show how these key European actors are staking out positions in the context of the global race for supremacy in AI.

The European Umbrella Strategy

In comparison with the US, the EU as a whole is seen as lagging behind in the field of AI in terms of the volume of investment, the industrial structures (number of com-

panies active in the field), its innovative capacity (number of patents filed) and its ability to transfer research into practical and commercial applications. In terms of the availability of data necessary to train and perfect AI systems, Europe is not only at a disadvantage compared to the US but also compared to China. While due to the relative fragmentation of the EU, European actors do not have access to large data pools, the business models of US tech giants have allowed them to accumulate enormous amounts of data that they can now use in the area of AI. Indigenous Chinese actors active in the field of AI, for their part, benefit from a vast user pool, weaker regulation in the field of data protection and a government that favors the transfer of data to them.

Only in the field of AI research and science does Europe seem to be able to keep pace with the global leaders. For instance, 28 per cent of the academic papers on AI that were registered on the Scopus abstract and citation database in 2017 were affiliated with European authors, followed by China (25 per cent) and the US (17 per cent). Despite competitive research and teaching, however, the European countries increasingly find themselves confronted with a drain of AI talents driven by international competition.

Against this background, the EU member states released a joint statement in April 2018, the Declaration of Cooperation on Artificial Intelligence, in which they agree to tackle the main challenges caused by developments in AI together. Major focal areas include the strengthening of the EU's technological and industrial competitiveness and easier access to data. Moreover, the member states aim to create an appropriate legal and ethical framework for AI that conforms to core European values.

Based on this statement and pursuant to a request by the European Council, the European Commission (EC) issued its "Communication on Artificial Intelligence" on 28 April 2018. This document, which essentially constitutes the outlines of a EU umbrella strategy, adopts the targets laid out in the Declaration and indicates how these are to be achieved. The EU will seek to enhance its technological and industrial competitiveness by investing in research and industry. Furthermore, society is to be prepared for the socio-economic changes

caused by AI through changes to the educational system, talent promotion programs, as well as fostering of labor market transitions.

In cooperation with national and private-sector actors, the EU umbrella strategy aims to increase investments in AI research and innovation by at least 20 billion Euros by the end of 2020. In that light, the EC will boost its investments under the Horizon 2020 research and innovation program by 1.5 billion Euros for the period of 2018–2020. These investments will be complemented by the European Fund for Strategic Investments, which will be tapped to provide companies and start-ups with additional funds of more than 500 million Euros by 2020 to be invested in AI. Moreover, taking into account the EU's regulatory framework on data protection, amongst others the General Data Protection Regulation (GDPR), data gathered by public authorities are to be shared among the member states and made accessible to select actors in the field of AI. In light of a strong emphasis on the ethical dimension, the EC-appointed High-Level Expert Group on AI has furthermore prepared an "Ethics Guideline for Trustworthy AI", which is to provide guidelines for ethical AI development and applications that relate to aspects related to transparency, accountability and its human-centric nature.

Thus, the EU umbrella strategy for AI deliberately takes a holistic approach, which

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ranges from research and industry promotion, data access and governance to a strong focus on a corresponding regulatory and ethical framework. This means that in the context of global competition, the EU emphasizes preserving its competitiveness in the fields of AI research and teaching. At the same time, however, the EU also aims to create the conditions required for closing the gap with the US and China in the areas of available capital, its industry structure, access to large data pools and its ability to transfer research into practical and commercial applications. All this is undergirded by a strong emphasis on the respect of the respective regulatory framework, for example regarding data protection as well as eth-

ical aspects like transparency and accountability when developing and applying AI.

Regulatory and ethical aspects have lower priority in the Chinese development model, and, to a lesser extent, in the US as well. In the latter, because corporate actors, who mostly have the lead in the development and application of AI, are more inclined to prioritize profitability over considerations of ethics or data protection. The Chinese model, on the other hand, is driven by a different set of values where data protection and ethical questions such as transparency are of secondary importance. The EU umbrella strategy, therefore, consciously aims to position the EU in a niche with an alternative model that puts the regulatory and ethical aspects at the forefront of AI.

France's AI Strategy

In the context of global competition over AI, France finds itself in a situation similar to the EU as a whole. While the country is well positioned in the field of AI research and teaching, it lags behind the US and China in terms of financing options for private sector actors. This is also apparent in the French national industrial structure, which has proportionally fewer AI companies than the US and China. Moreover, for the same reasons as the EU overall, France faces a competitive disadvantage in the field of data availability, and it is furthermore increasingly suffering from the international competition for top AI talents.

Against this background, in September 2017, the government of French President Emmanuel Macron commissioned an expert group to report on the opportunities and risks facing France due to AI. Some of the recommendations made in the *Rapport Villani* were taken up as cornerstones of the French AI strategy in a keynote address by Macron in March 2018. This strategy, as outlined by Macron, also takes a holistic approach and follows the prioritization set out in the EU umbrella strategy. Accordingly, the French strategy strongly focuses on promoting research and education. 665 million out of the 1,5 billion Euros planned to be invested in AI till 2022 are to be devoted to research and education. Additional investments from the private sector are intended to increase the total volume of investments into AI research and education to 1 billion Euros. In this vein, several interdisciplinary AI university centers are to be created and to be connected to form a network on the national level. Further-

more, about 40 new professorships are to be created while the number of available postgraduate positions are to be increased. In order to attract and retain AI talents, the governments also aims to offer competitive salaries in public research and allow for researcher to simultaneously also be active in the private sector.

The strategy Macron outlined also contains an element of industrial promotion, much like the EU strategy, to facilitate the access to venture capital for small and medium-sized enterprises in the field of AI. The French strategy also deals with the question of data availability. In consideration of the regulatory framework of the EU including the GDPR, data gathered by the French government is to be made available to AI research and select private-sector actors. France plans to work closely with other EU member states and more specifically with Germany in order to share and make data more accessible for European AI actors. The French strategy, too, strongly em-

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phasizes ethical considerations such as transparency, explicability and accountability and, therefore, also seeks to take a human-centric approach to AI development and application.

Germany's AI strategy

While Germany has an excellent AI research landscape, it is disadvantaged compared to the US and China in terms of available risk capital, the industrial infrastructure, and the availability of large scale datasets. As such, in light of the global competition over AI, Germany finds itself in a similar starting position as its neighbor France and as the EU overall. Accordingly, Germany's AI strategy – presented in November 2018 – is largely in line with the EU umbrella strategy, and much like the French model, pursues a holistic approach. It aims to secure Germany's position as an AI research location while fostering the competitiveness of the German economy. At the same time, there is a strong focus on providing access to large scale datasets in line with EU privacy laws such as the GDPR and on ethical considerations in general.

The German federal government aims to provide 3 billion Euros by the end of 2025

as part of its AI strategy. It is anticipated that this engagement will have a leveraging effect on the economy, academia, and the *Länder* that will result in the funds being matched. Of the 500 million Euros budgeted for 2019, 190 are to be invested in research and education. For example, the existing German centers of competence in the field of AI are to be expanded and new centers are to be created. Furthermore, at least 100 new chairs of AI research are to be created as well as programs to promote junior scientists. Moreover, the German AI strategy envisages measures to retain top researchers in the country by, in a similar way to France, offering work conditions and salaries that are attractive and competitive internationally. In the area of industry promotion, the German AI strategy will seek to facilitate the access to venture capital for indigenous private-sector actors while measures aimed at facilitating the transfer of research into practical and commercial applications are to be expanded. In 2019 alone, 230 million Euros are to be invested in this area.

An Alternative Model?

The approaches of both the German and the French AI strategies are aligned with the EU umbrella strategy. Both strategies envisage a holistic approach to foster research and talent, industry promotion, and access to data while strongly emphasizing the attendant regulatory framework as well as ethical considerations. In the context of the global race for supremacy in AI, efforts in research and education will therefore seek to build on an advantageous starting position to secure a leading place in this area. Despite planned investments in indus-

try promotion, including mechanisms to ensure easier access to venture capital and large scale datasets, it will probably prove difficult to catch up with the US and China. Accordingly, for the EU and its two key actors, the goal will likely be to prevent the gap from widening too far in these areas.

Based on the EU umbrella strategy and the EU's legal framework such as the GDPR, the French and German AI strategies also

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strongly emphasize the regulatory as well as the ethical aspects in their national AI strategies. For the reasons mentioned above, these aspects are not only largely neglected in the Chinese model, but to a certain extend also in the approach predominately pursued in the US. Accordingly, there is a potential niche for the EU to position itself with an alternative model that

puts regulatory and ethical aspects at the forefront of AI development and application. The European umbrella strategy and the French and German strategies seem to be a step in the right direction in order to establish the EU as an actor with a more human-centric approach to AI.

Whether this can succeed will now largely be dependent on how the other member states will position themselves. Of the other EU member states that have published an AI strategy, including the United Kingdom, Italy, Sweden and Denmark, all also seem to put a strong emphasis on the regulatory and ethical dimensions. If the EU succeeds in positioning itself in that niche, the question then arises as to whether the chosen approach can compete with the approache taken in the US and the Chinese model.

The European approach seeks to have an ethical and regulatory framework in place that will accompany, influence and steer future advances in the field of AI. The Chi-

nese model and the US approach, though for different reasons and to different extents, give advances in the field of AI free rein while regulatory and ethical aspects are taken into consideration downstream. Both these approaches are likely to have their advantages and disadvantages. The US and the Chinese models might yield faster results. However, it remains questionable if these approaches will prove to be sustainable in the mid- to long term. By following a human-centric model that puts a strong emphasis on ethical and regulatory aspects, Europeans certainly remain true to their core values and, therefore, true to themselves. However, only time will tell if such an approach will prove successful in the global race for supremacy in AI.

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