Joining the dots – A map of Europe's AI ecosystem

france is AI

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Roland Berger

Foreword

The battle for AI supremacy has begun. Around the globe, governments, businesses and society have realized the technology's potential to transform the world we live in, whether by automating tasks or providing insights into our health, behavior or livelihoods.

But as with past game-changing technologies, AI's arrival will not be without upheaval. There will be major implications: businesses, jobs and living conditions will all be affected, leaving many fearful of the world to come.

This means it's important to get AI right. At the moment, many players are pursuing the technology enthusiastically, but failing to fully harness its potential.

Roland Berger and France Digitale are convinced AI will be a force for good – provided it is properly implemented. As such, we feel there is a need to better understand the technology, and also the whole ecosystem behind it.
This report goes some way towards that. France Digitale has a wealth of data on AI in Europe, and suggested that Roland Berger make a joint effort to organize and analyze it, to build a picture of the European AI ecosystem.
The result is a long-term knowledge tool that consolidates Europe's AI expertise, and provides a great base to bolster Europe's fight for AI leadership.

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Cover illustration: feoris / istockphoto

Management summary

Artificial intelligence (AI) is not yet so intelligent that it happens by itself. The process of automating tasks previously only suited to humans is driven by huge amounts of data, smart algorithms and even smarter people.

By the same token, AI is not only about startups developing the technology or using it in self-driving cars or to automate emails. There is a whole ecosystem behind it. While startups are a vital part, this also includes research laboratories (including public and private labs, and combinations of the two), all kinds of communities (from informal groups to conferences and public/private associations) and investors.

Roland Berger is at the forefront of AI knowledge research, having published many important studies in this area. One of the most recent (Artificial Intelligence – A strategy for European startups) found that Europe's AI ecosystem is thriving, but, unlike in the US or China, it is fragmented and lacks a clear strategy. This means the continent could get left behind.

To help remedy this, and in partnership with France Digitale, we carried out a study to investigate what exactly the European AI ecosystem looks like: who's involved, where they're based and what they're doing. It covered 30 countries and included a detailed look at startups, products, research labs, communities and investors.

The result is a comprehensive map of the European AI ecosystem. It shows a rich and diverse landscape, highlighting three distinct country clusters. In summary, the ecosystem consists of 2,261 startups, 383 labs and 3,801 communities spread over 4 dominant, 12 rising star and 14 follower countries.

In this document, we report the study's methodology and results, analyze what they mean and suggest ways in which the currently fragmented European AI ecosystem can find its voice.

Methodology: Crunching the numbers

Roland Berger and France Digitale have built an original database containing information on three types of European AI players: startups, labs and communities. This was done using desk research and sources such as CB Insight, Crunchbase and Traxcn. A web survey across our networks was also conducted to collect more detailed information. The result is a detailed picture of the European AI ecosystem in 2018, which will be updated and enriched over time.

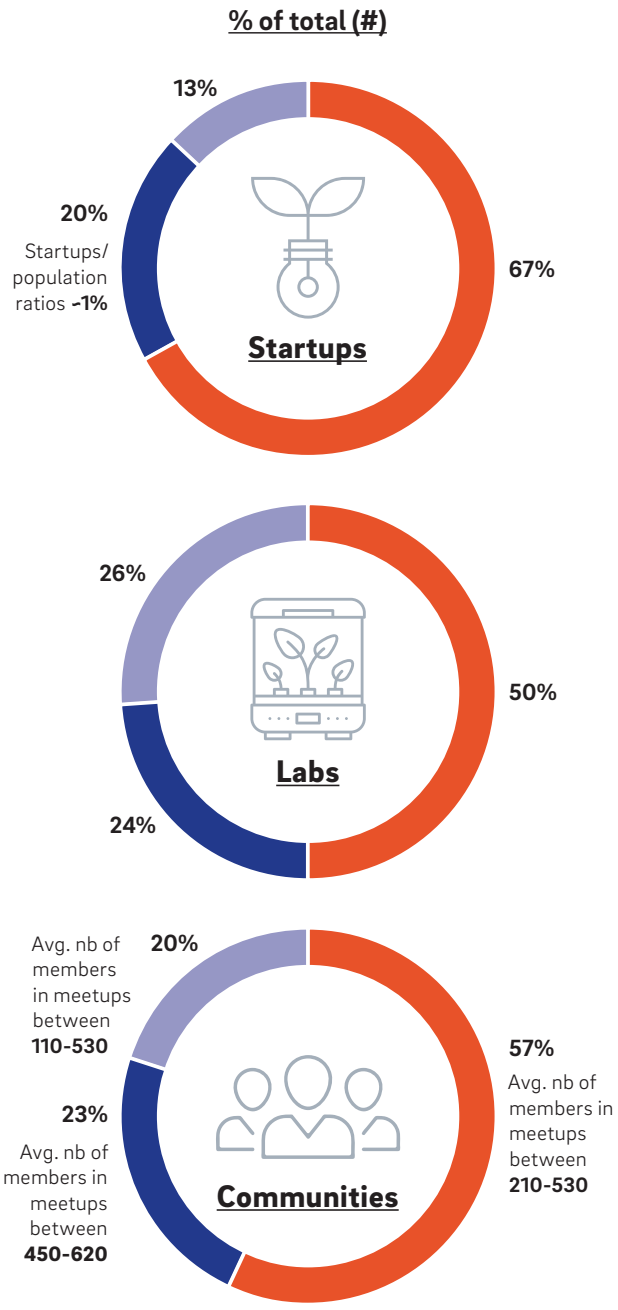
The study's scope covered the 28 European Union members plus Norway and Switzerland. Within each, startups, labs and communities were identified according to specific criteria. For example, startups had to be a producer or user of a recognized AI technology such as machine learning or neural networks; labs had to be in educational institutes or run by public, corporate or public/private backers; and communities had to fall under a list of categories from Facebook groups to summer schools and magazine readers.

Two key indicators were then calculated for each country. The first was mass criteria, or the volume of startups, labs and communities. The second was ecosystem density, or volume divided by the country's population. Where relevant, other analysis was performed, for example measuring the activity of communities by number of members or planned events. We also had a close look at policy initiatives developed by the different countries, and the European institutions.

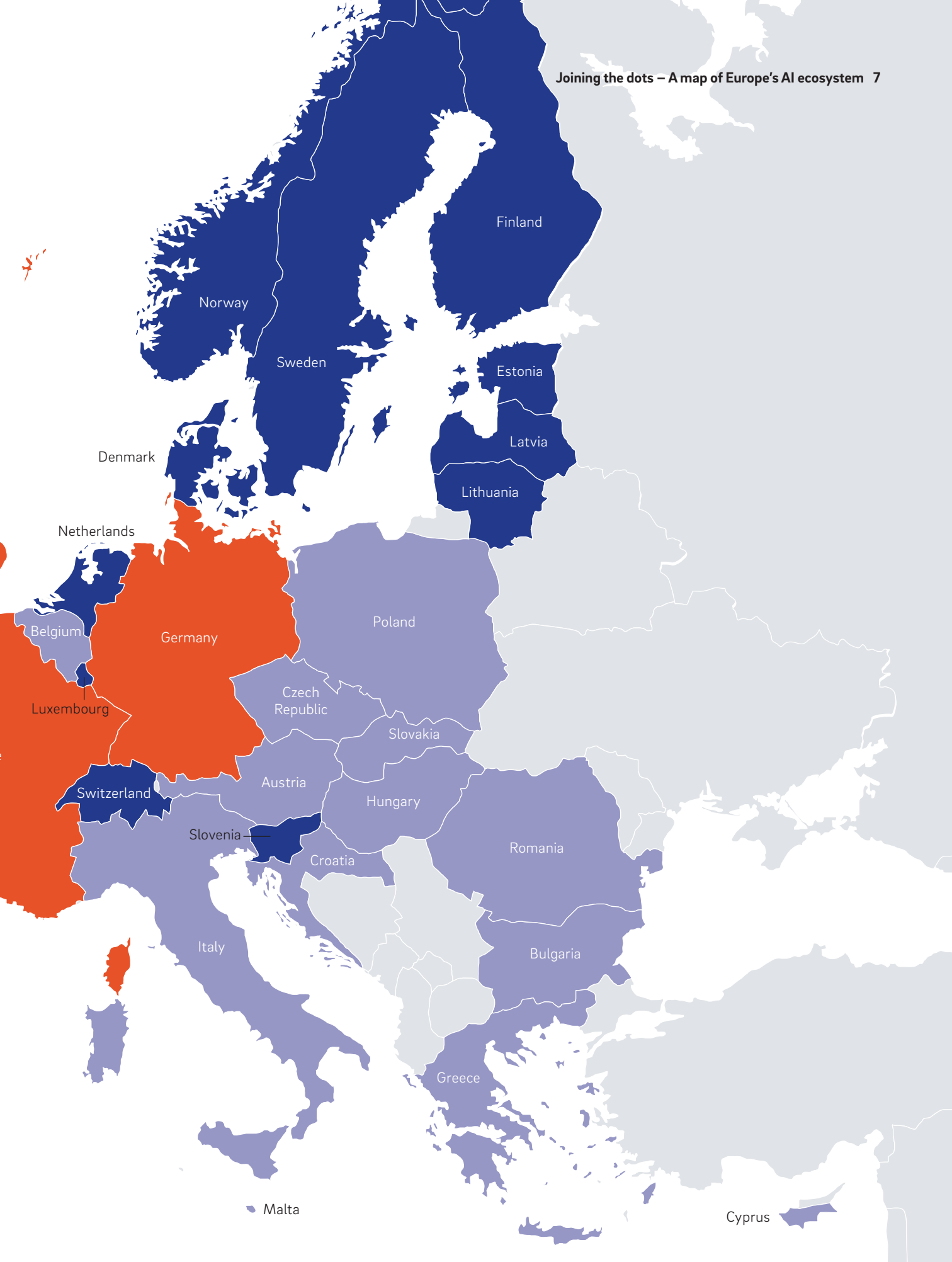
According to their results, countries were clustered into three categories: dominant, rising star or follower. The follower group is not considered in detail in this report.

Europe's AI players

While leaders are home to the highest volume of AI players, rising stars boast very dense AI ecosystems.



Source: Roland Berger


Finland
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Latvia
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Poland
Czech Republic
Slovakia
Austria
Switzerland
Hungary
Slovenia
Croatia
Romania
Italy
Bulgaria
Greece
Malta
Cyprus

1. Results: Volume and dynamism

The dominant four

Measured by mass criteria, four countries stood out as dominant players. The UK, France, Germany and Spain are clearly driving Europe's AI ecosystem, contributing 60% of startups, labs and communities across the 30 countries. Broken down, they are home to 1,514 startups (67% of the total), 193 labs (50%) and 2,159 communities (57%).

The four finished top in all three volume categories, with only the order of the top three differing. Spain ranked fourth in each case. The UK finished top in the startup (774) and communities (735) categories, while France led in number of labs (82).

Other notable volume figures included the fact that 70% of the labs within the top four are based in publicly funded universities/schools, and that so-called meetup groups were by far the largest community type, dwarfing others such as LinkedIn groups, conferences or research networks. Twitter use was also higher among the top four (see next page).

The four are also leaders when it comes to technological and sectoral trends. In fact, they are so dominant that they are imposing these trends on the rising stars and follower countries. The distribution of the AI technology used across Europe, for example, is almost the same among all three groups, reflecting the four leaders' preference for machine/deep learning and natural language processing.

The leaders also have a focus on four AI sectors that is replicated by the rising stars and followers: tech, financial services, entertainment/media/culture and healthcare/biotech make up very similar proportions of the market in each category (between 7% and 17%). Some 44% of startups in the top four have applications in these sectors.

The figures suggest that the successful AI model developed by the leaders is being copied by their neighbors.

The leaders have a focus on four AI sectors that is replicated by the rising stars and followers: tech, financial services, entertainment/media/culture and healthcare/biotech.

In short, everyone is working in the same areas, and following the trends started by the dominant four.

The rising stars

Our cluster of rising stars comprises 12 countries, mainly Nordic and Baltic states, which are snapping at the heels of the leaders and becoming increasingly influential in AI. While their overall volume of startups, labs and communities is much lower than the top four (about 22% compared with 60%), some rising stars, such as the Netherlands and Sweden, were close to overtaking Spain in individual categories.

Tweet or delete?
AI on Twitter

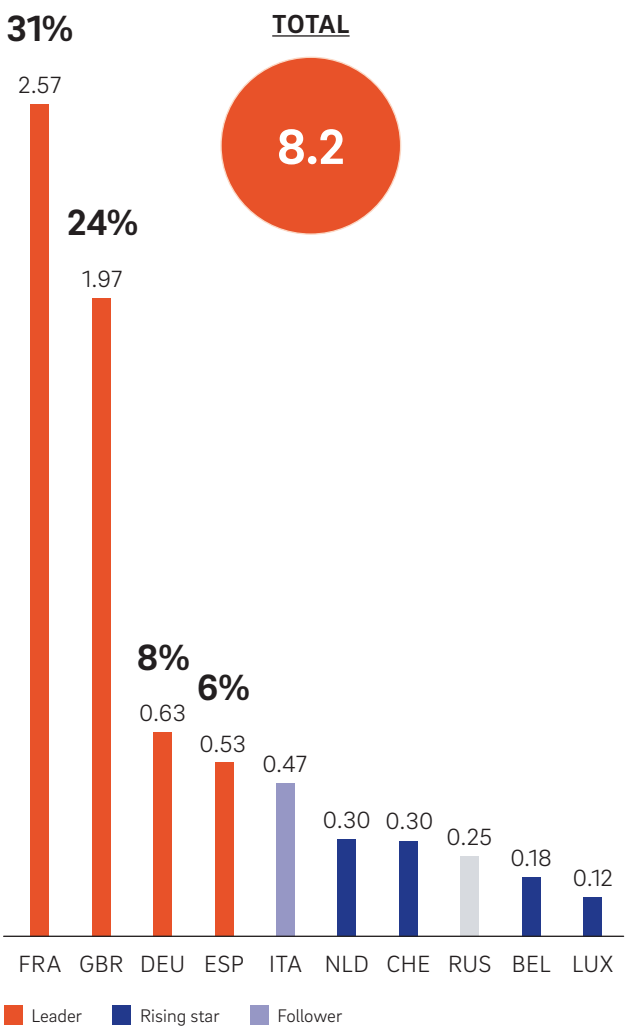
To get a snapshot of AI activity in Europe, we performed an unscientific but nevertheless revealing Twitter analysis. Data was collected for the 30 study countries plus several large cities over 13 months (three for the cities) based on mentions of the key words "artificial intelligence" and "ai", plus their French and German equivalents. From these, the level of output (number of tweets) and engagement (number of retweets, shares, likes) were calculated.

While the results had an obvious bias towards the UK, France and Germany, they gave a good idea of the level of interaction around AI. More than 8.2 million tweets were counted in total, with France (2.6 million tweets – 31% of the total) and Paris leading the country and city output rankings. Again, the dominant four topped the country chart, with the UK in second place (1.98 million tweets) and Germany in third. Italy was fifth, with rising stars the Netherlands and Switzerland close behind (both just under 300k). Interestingly, while London finished as the second-placed city, Madrid beat Berlin to third position with 5% of the total city output.

When it came to engagement, France and the UK again finished as the top countries with 96,381 and 59,590 retweets/shares/likes, giving average levels of engagements per tweet of 16 and 10.1. But Italy and Switzerland overtook Germany and Spain to secure third and fourth spot. The dominant four's capitals took top places in the city stakes.

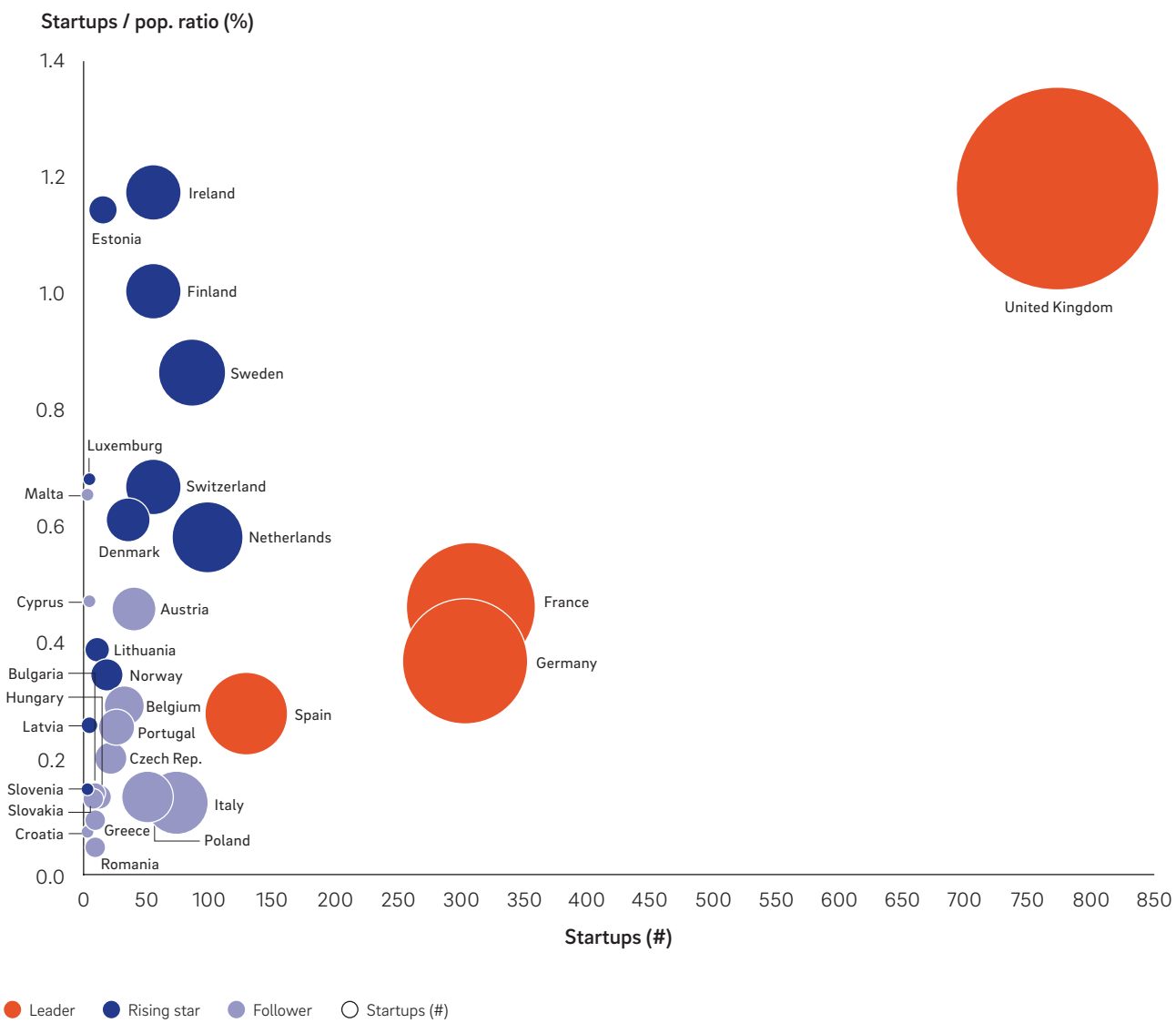
Twitter use is highest among the leaders.
France and United Kingdom host the most dynamic communities on twitter.

Number of tweet (millions)



Source: Roland Berger

STARTUPS - Volume vs. density.
Leaders are home to 67% of AI startups, but Nordic and Baltic countries show density dynamism.



Source: Roland Berger

The cluster members are characterized by two main factors. Firstly, their dense ecosystems, or high number of startups/labs/communities per population size.

Their average ratio of startups, labs and communities per population is higher than the leaders' average in each case: 0.7% vs 0.6% for startups; 0.4% vs 0.04% for labs; and 1.2% vs 0.8% for communities. While reflecting their smaller populations, this also indicates thriving and dynamic AI ecosystems in this cluster of countries.

Under this metric, individual rising stars also more than held their own against the dominant four. At 1.2%, Ireland was joint-top with the UK in its ratio of startups per population, with Estonia and Finland following close behind. In fact, this was the only appearance of a dominant country in the three categories.

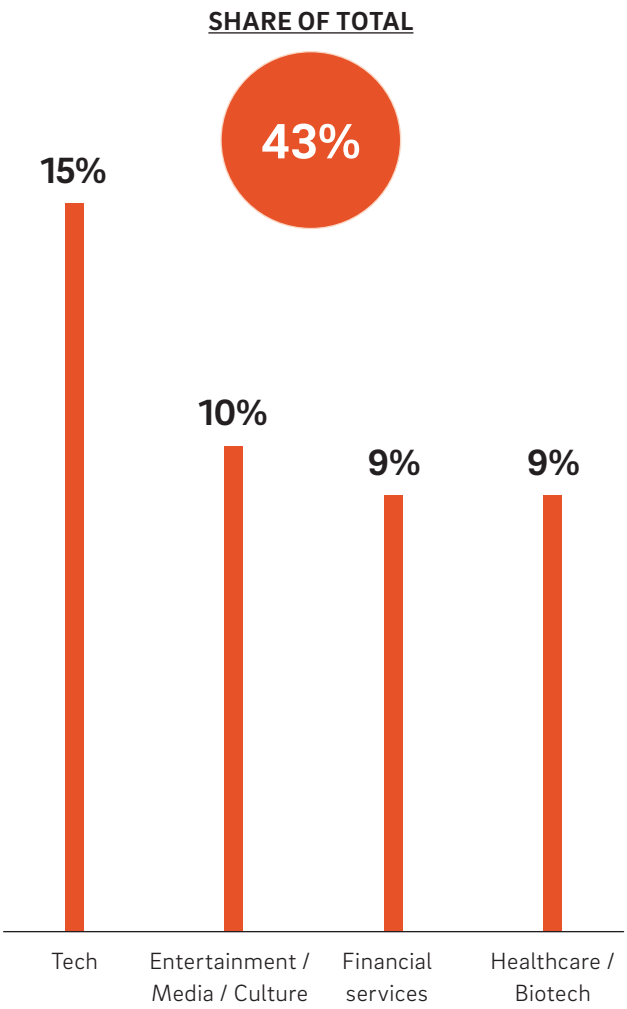
The rising star group is also characterized by its high level of private sector AI research. For example, 26% of labs in the 12 countries are run as public-private partnerships – 4% more than the top four. This suggests strong investor support for AI activity in the rising star countries. The proportion of educational labs, corporate labs and public institutions is broadly the same as the leader countries.

Rising stars are also mixing it up with the leaders when it comes to dynamism. The average number of meetup members was actually higher in Ireland than in the lowest ranked leader country, Germany (528 members vs 445). The Netherlands also ranked highly, as did several follower countries such as Hungary and Poland.

As mentioned above, one area where the rising stars failed to shine was in diversification. They are following the top four in terms of technological and sectoral application of AI. One notable difference, however, is that whereas the leaders are more inclined to the tech and financial services sectors, the rising stars tend towards tech and entertainment/media/culture.

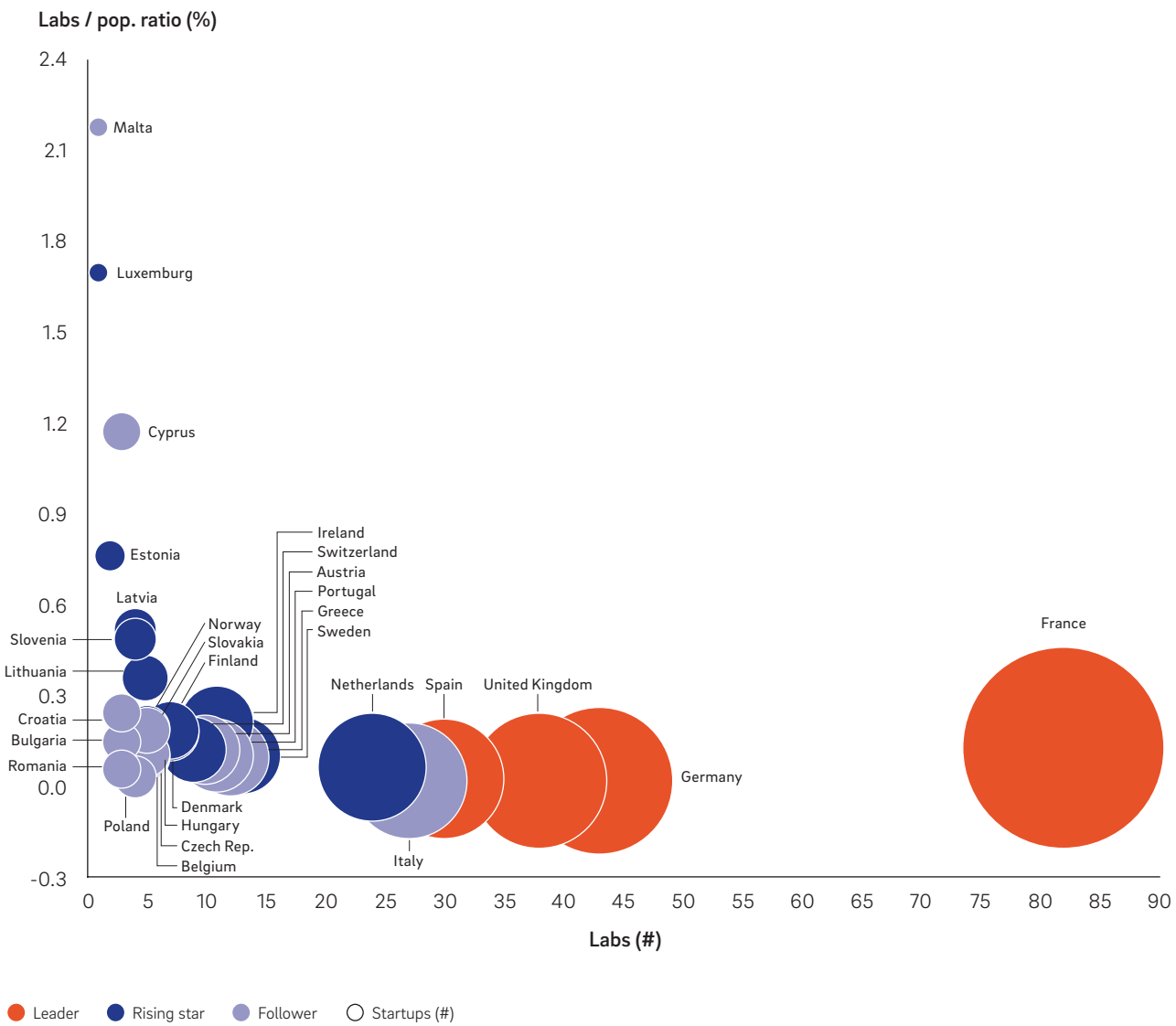
STARTUPS - Preferred sectors.
Sector preferences are similar across leaders, rising stars and followers.

Ranking by volume



Source: Roland Berger

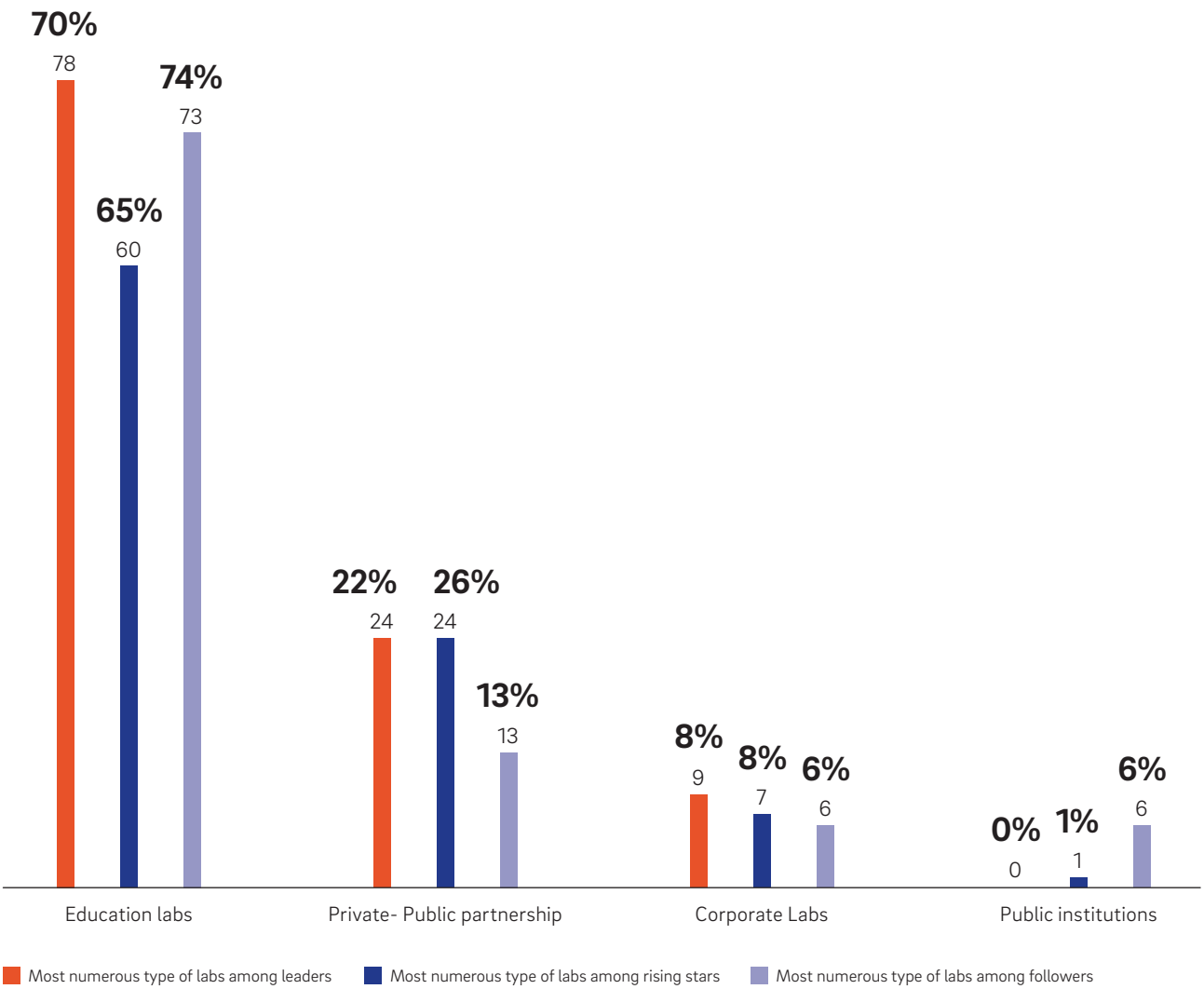
LABS - The research landscape.
The leaders dominate the lab ecosystem.



Source: Roland Berger

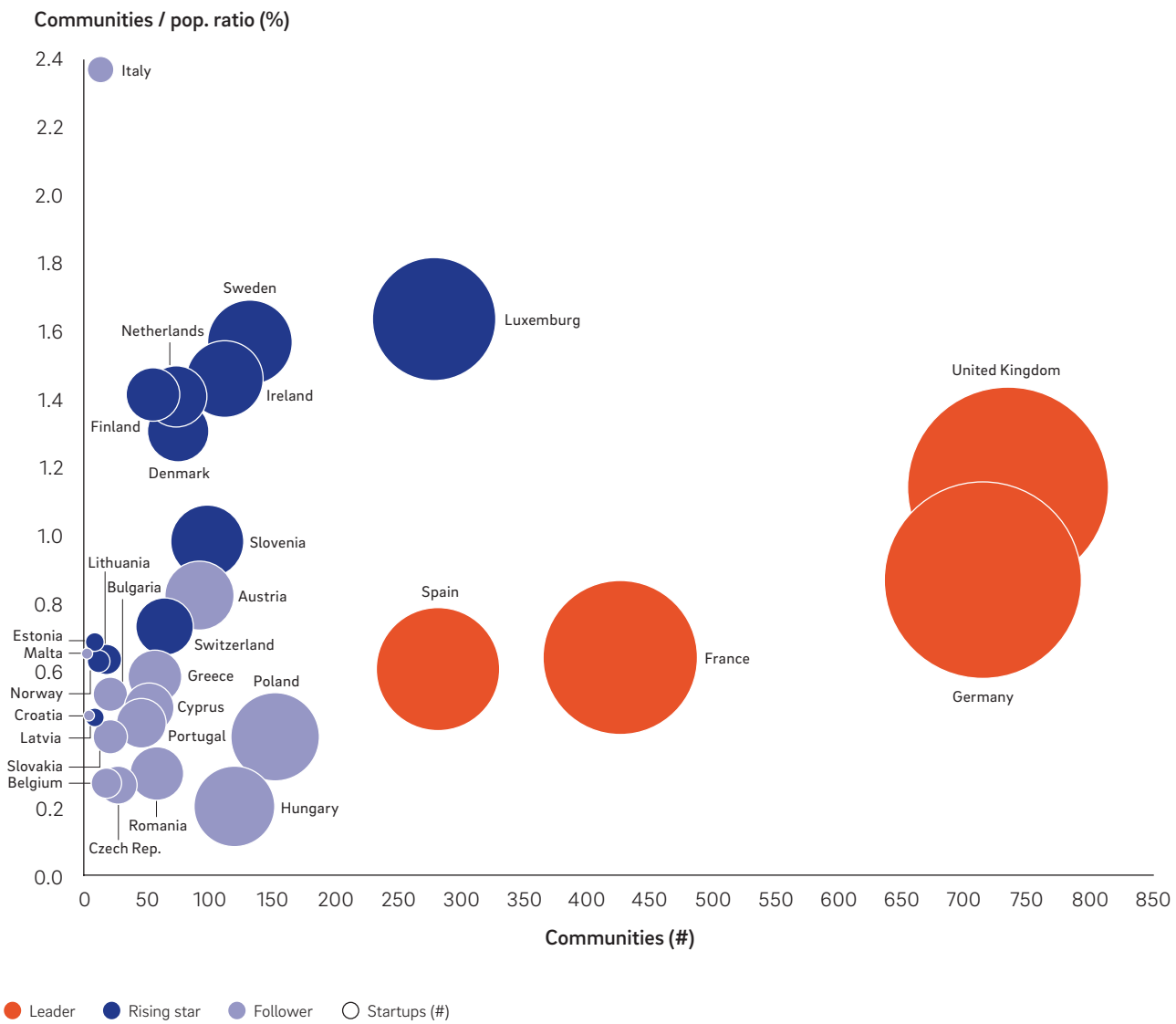
LABS - Public funds fuel most AI research.
But rising stars are seeing increasing private sector penetration.

Ranking by volume



Source: Roland Berger

COMMUNITIES – Look who's talking!
The AI communities of rising stars are challenging those of the leaders.

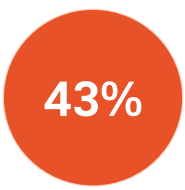


Source: Roland Berger

COMMUNITIES - The main event.
The leaders account for 65% of AI-related meetups.

Number of past (since 2007) and futures events top 14 ('000)

Countries	Past events (#)	Future events (#)	Share of total (%)
UK	**7,183**	**685**	**24%**
Germany	**6,158**	**811**	**21%**
France	**3,485**	**361**	**12%**
Spain	**2,442**	**141**	**8%**
Netherlands	1,690	171	6%
Poland	1,316	21	4%
Ireland	974	26	3%
Norway	830	53	3%
Switzerland	757	78	3%
Sweden	726	11	2%
Belgium	713	45	2%
Hungary	573	34	2%
Italy	513	76	2%
Romania	442	3	1%
Denmark	379	21	1%



Source: Roland Berger

2. Towards a unified European voice on AI?

Strong but fragmented

It's clear from our study's results that Europe's AI assets are fragmented and geographically diverse. Talent, capital and research centers are spread across the continent, in contrast to, for example, the US's highly centralized – and successful – AI base in Silicon Valley. To address this it is necessary to strengthen European initiatives so that the continent's AI ecosystem speaks with a unified voice.

At a national level, EU member states are making progress on AI, despite a lack of organized co-operation between them. While most do not yet have a national regulatory framework, they have recently launched initiatives to promote AI domestically, with varying levels of financing.

In France, President Emmanuel Macron has outlined a National Strategy for AI to position the country as a worldwide hub for AI. It entails the creation of a national network of specialized institutes to attract researchers and an ethics committee to support and monitor AI development. Mr. Macron also undertook to spend EUR 1.5 billion of public money on AI by 2022.

Meanwhile, in the UK, another of our top four countries, the government last year announced GBP 500 million of public funding for AI, 5G and full-fiber broadband. The money is part of an "AI sector deal" which also includes help for businesses to scale up and funding to expand its tech hub into a national network.

In addition to government initiatives, the private sector is also active. Of the more than USD 16.9 billion privately invested in European startups in 2017, USD 774 million was dedicated to AI and data. That brings total private-sector investment in AI and data to USD 2 billion since 2014. In comparison, US and Chinese based AI startups raised respectively 4,4 and 4,9 billion dollars in venture capital in 2017 alone. The problem is, the fruits of these investments are not being leveraged at a pan-European level to reach critical mass.

The rising stars are characterized by their dense ecosystems, and a high level of private sector AI research.

The European Union has launched few specifically AI-oriented initiatives. The European Strategy for Artificial Intelligence was launched in April 2018, backed by EUR 1.5 billion in funding. Its main goals include boosting the EU's scientific base, technological know-how and industrial capacity; preparing for socio-economic changes triggered by AI; and ensuring the technology has an appropriate ethical and legal framework.

Post-2020, the Multiannual Financial Framework for 2021-2027 will be key for the development of the technology. Of the EUR 9.1 billion earmarked for the digital economy, EUR 2.5 billion will be allocated to AI.

Overall, Europe's plans lack critical volume. Its budget for promoting and fostering AI development is relatively low compared to the US and China, whose governments have announced 10 figure budgets to win the AI race.

3. Recommendation

Europe has the potential to spearhead the AI revolution. Nevertheless, it is unlikely that the EU's strategy will be enough to compete with the Chinese and US juggernauts.

To move away from the current ecosystem of isolated national AI models dominated by a handful of dominant players towards a more holistic, European ecosystem with a unified voice, change is required.

To reach their full potential, the EU Commission's plans need to be paired with AI-friendly regulation. Such policy should increase the amount of data available and facilitate its exploitation.

The former calls for a pro-active open data policy, giving access to the vast quantity of data the public sector sits on. Achieving the latter requires the removal of burdensome regulation, like the text and data mining restrictions in the Copyright Directive review. Free Flow of non-personnal data regulation is a model in such regard.

A common and clear legal framework, for scientists and entrepreneurs, is a sine qua non condition for the development of the AI ecosystem across the continent.

To move away from the current ecosystem of isolated national AI models towards a more holistic, European ecosystem with a unified voice, change is required.

Credits and copyright

WE WELCOME YOUR QUESTIONS, COMMENTS AND SUGGESTIONS

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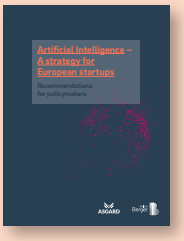
About us

Roland Berger, founded in 1967, is the only leading global consultancy of German heritage and European origin. With 2,400 employees working from 34 countries, we have successful operations in all major international markets. Our 50 offices are located in the key global business hubs. The consultancy is an independent partnership owned exclusively by 220 Partners.

France Digitale brings together the champions of digital entrepreneurship: startups with strong growth plans and potential investors (venture capitalists and business angels). To build an alliance between digital entrepreneurs and investors, so that France becomes fertile ground for the creation of digital champions of International stature. For more information, please visit www.francedigitale.org.

Study
AI startups as innovations drivers: Europe must take action to establish a competitive ecosystem
(2018)



Roland Berger and Asgard partnered up to provide the first comprehensive overview of the global AI ecosystem based on data from start-ups in all regions of the world.

Think:Act Magazine
Ai think, therefore Ai am
(2018)

Everybody is talking about how artificial intelligence will change the world. Find out what AI means in 2018 and beyond for your business in our Think:Act.

Publisher

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