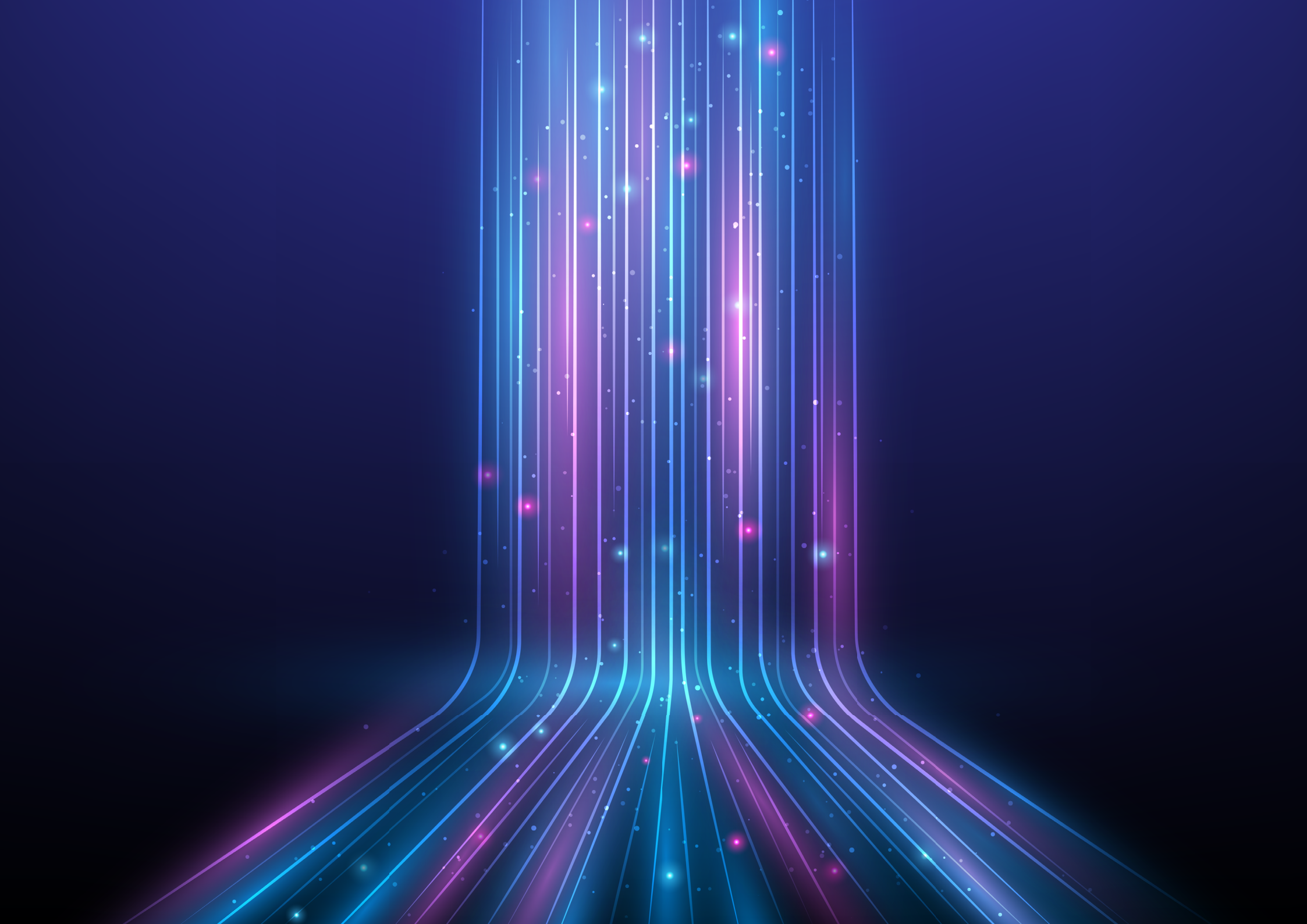


# EUROPE'S DIGITAL FUTURE:

*Strengthening Competitiveness and Security*







# SETTING THE PATH FOR A DIGITAL FUTURE

**Security, prosperity and democracy** are the key words that define the Union's direction over the upcoming years, according to the new European Commission's priorities. In particular, the Commission's work programme for 2025 lays out clear policies for bold and fast change for the EU to remain competitive, strategically independent and prosperous by responding to interrelated global challenges. While the 'digital' transformation does not appear as a separate priority, nor is it explicitly mentioned, it will be crucial for the EU to achieve many of the goals that it sets forth.

For many, the digital transformation that is taking place in our societies can be compared to the Industrial Revolution, with sweeping changes affecting every aspect of our lives. From connectivity to social media networks, healthcare systems and medical

advancements, clean technologies and national security, digital innovation is not limited to a specific policy area but rather reflects an underlying, structural change.

The greatest challenge and opportunity for the EU in the upcoming years will be to establish itself as a leader in the development and deployment of new technologies. A successful digital transition is the key to increase competitiveness of the EU vis-à-vis other powers such as the US and China, to ensure a clean transition but also to address economic security, defence and ultimately ensure the prosperity and strategic independence of the Union. Critical technologies such as semiconductors, AI, energy and health technologies and quantum computing, alongside data, regulation of online platforms and cybersecurity are priority areas for the EU to achieve its goals.

“

Europe must now **strengthen its digital sovereignty** and set standards, rather than following those of others.

*European Commission,  
A Europe fit for the digital age<sup>1</sup>*



According to the latest European Commission report mapping the EU's digital transition, the EU is behind the US and China in the global tech race<sup>2</sup>. Around 80% of the technologies and services that are needed for Europe's digital transformation are designed and manufactured outside the EU<sup>3</sup>. Europe hosts only 13% of high-value startups, and only 3 of the top 50 information and communication technology (ICT) companies are European. The startup ecosystem is growing slowly, with European companies generally scaling up less than their Chinese or American counterparts. Additionally, there has been limited progress in advancing connectivity – including 5G coverage – and a slow digitalization of SMEs<sup>4</sup>. Investments, red-tape, and overregulation, as well as implementation and enforcement of current policies are the major challenges that the EU must overcome.

What has become increasingly evident across the world is that technologies are advancing under different global governance approaches: While the US favours minimal restrictions to encourage innovation, China has been

enforcing strict regulations to control technological development and align it with national interests. These varying strategies reflect the complex landscape of fostering innovation, regulating new technologies, and point to different priorities of global powers.

In the past years the EU has been developing policies and launching numerous initiatives for its digital future, including Action Plans and Strategies for specific technologies such as quantum computing, AI and semiconductors. This has been accompanied by significant funding pooled most notably through the Strategic Technologies for Europe Platform, supporting investment in critical technologies in Europe. Significantly, it has been promoting its own vision of technological development, one that is firmly rooted in European values, certainty and transparency for citizens, simple and effective rules for businesses. The key to the EU's prosperity might lie exactly in developing technologies while setting higher standards for people and businesses and demonstrating that this approach works.



EUROPE HOSTS  
**ONLY 13%**  
OF HIGH-VALUE STARTUPS



# WHY TECHNOLOGIES MATTER

The EU's digital transition is more than the deployment of cutting-edge technologies. Innovation is at the heart of the block's future development. Firstly, digital technologies are crucial for the EU's **economic growth and competitiveness**. Fostering innovation and introducing simpler and streamlined industrial processes through new technologies opens **new market opportunities**, fosters **economic growth**, and strengthens the EU's strategic autonomy globally. Additionally, investing in digital resilience can **contribute to the EU's security** through improvements in cyber defence mechanisms and better safeguarding critical infrastructures to ensure the resilience of European societies to foreign interference and disruptions in its supply chains. The development of technologies that can be used in security and defence is also central.

Furthermore, digital technologies are central to **achieving the EU's climate objectives**, including climate neutrality by 2050 and reducing the digital sector's carbon emissions. Smarter energy consumption, efficient resource management and sustainable solutions are some of the benefits of new technological developments, as is the EU's increased energy security.

Finally, technologies can **work for individuals through better services**, including in healthcare. For instance, the development of a European health data space can increase research, diagnosis and treatment and enhance the quality of healthcare across member states. Thus, the digital transformation will necessarily underlie the many changes to achieve a secure, prosperous and democratic future.



# THE CURRENT POLICY ENVIRONMENT:

## *Achievements, challenges & future outlooks*

Recognising the importance of these transformations, in 2020 the European Commission published an **EU Digital Strategy**<sup>4</sup>. The Strategy encompasses numerous goals to guide the European digital transition, to promote the development of technology that can make a real difference in people's daily lives, that can boost **European companies' global competitiveness** and that enhances **democratic values, respects fundamental rights** and contributes to **sustainable, climate-neutral** and resource-efficient **economy**<sup>4</sup>.

These are the basic tenets guiding the work of the EU in its digital transition. To these three elements, this report adds **strengthening European security and defence**, which has become a priority under the current Commission's mandate. The goals of the Strategy were clarified with the publication of a Digital Compass in March 2021, which measures development against targets set for 2030<sup>3</sup> - contributing to the overall update of technologies in the Union and fostering the emergence of high-growth tech companies<sup>5</sup>.

## IN NUMBERS:

### THE EU...

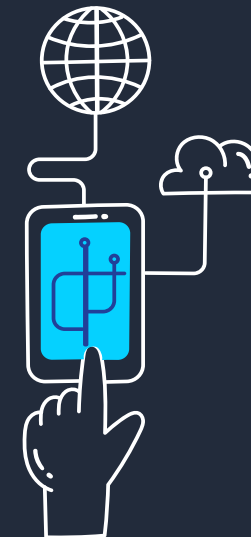
- 1 IS HOME TO **13% OF HIGH-VALUE STARTUPS** – FOR A TOTAL OF 263, COMPARED TO THE 387 IN CHINA AND 1539 IN THE US<sup>2</sup>
- 2 IS HOME TO **3 OF THE TOP 50 ICT COMPANIES**<sup>3</sup>
- 3 HAS **3 OF THE TOP 10 MOST POWERFUL SUPERCOMPUTERS**<sup>2</sup>
- 4 OWNS **LESS THAN 4% OF THE TOP ONLINE PLATFORMS**<sup>3</sup>



# TECHNOLOGY FOR PEOPLE, FOR FLOURISHING DEMOCRACIES AND OPEN SOCIETIES

People are at the centre of the EU's digital future. Rooted in commitments such as the European Declaration on Digital Rights and Principles for "a secure, safe and sustainable digital transformation"<sup>6</sup>, the EU has set forth a vision of digital development that focuses on **responsible digitalisation, democratic values** and fully embracing the potential of technologies for **individuals**<sup>14</sup>. In many regards, the focus on digitalisation fostering and upholding democratic values is a unique interpretation of the digital future, which does not find a reflection in the US or Chinese policies, where fast-paced innovation has not always developed alongside high standards of protection for users<sup>7</sup>.

One of the foundations of responsible digitalisation lies in a transparent and fair collection and **use of data**, a cornerstone of digital future societies. EU data is still largely collected and processed outside the EU: In 2021, 90% of EU data was managed by US companies<sup>7</sup>. This can lead to an immense missed opportunity and heightened transparency risks for citizens. Better data collection can reduce over-reliance on digital solutions created elsewhere and promote European services founded on common values, as well as increase choice for consumers.



IN 2021  
**90%**  
 OF EU DATA  
 WAS MANAGED BY  
 US COMPANIES<sup>7</sup>

Data is central for innovation in many sectors. Data is the backbone of technological advancements such as AI and quantum computing, which rely on datasets for development and testing. Additionally, better collection and access to data within the EU can benefit individuals, through improved services and more informed decision-making on issues that concretely affect citizens' wellbeing in society<sup>8</sup>. Using big data, businesses and governments can contribute to positive developments that include personalised medicines, efficient public services and safer public transport, prompt responses to climate emergencies and reducing carbon footprint<sup>9</sup>.



One of the foundations of responsible digitalisation lies in a transparent and fair collection and use of **data**, a cornerstone of digital future societies. EU data is still largely collected and processed outside the EU: In 2021, 90% of EU data was managed by US companies<sup>3</sup>. This can lead to an immense missed opportunity and heightened transparency risks for citizens. Better data collection can reduce over-reliance on digital solutions created elsewhere and promote European services founded on common values, as well as increase choice for consumers.

Several initiatives have been taken to regain control over European data under the **European Data Strategy**<sup>10</sup>. In January 2024, the EU launched the **European Data Act**, which aims to regulate who can access the data, who can use it and for what purpose. The initiative aims to make data more available and usable for data-driven innovation, while giving European citizens greater control over who collects their information and for what use<sup>10</sup>. By promoting data-driven advancements, the Data Act aims to increase fairness and contribute to a competitive and innovative digital economy, protecting the EU from unfair terms on data sharing imposed by strong players<sup>8</sup>. Ensuring that individuals as consumers can count on transparency and accountability in the behavior of online platforms who control information and data flows is also an underlying need addressed in the **Digital Services Act**, adopted in 2022<sup>4</sup>.

## THE DIGITAL SERVICES ACT AND THE DIGITAL MARKETS ACT<sup>11</sup>

The Digital Services Act (DSA) aims to create a safer online environment by setting rules on online platform's responsibilities in dealing with illegal content and disinformation, as well as transparency requirements for content moderation policies and decisions<sup>12</sup>. These clear standards for diverse platforms – from online marketplaces to social networks, app stores, and online travel platforms – are seen as key to ensure that European citizens can leverage the benefits of digital technologies, alongside a greater freedom in choice and better information, contributing to better individual decision-making. Still, questions remain on the DSA's ability to balance oversight of content with freedom of speech and its potential consequences for democracy.

Alongside the DSA, the Digital Markets Act (DMA), which entered into force in 2024, aims to regulate large online platforms, or “gatekeepers,” by setting rules on data collection, service interoperability, and fair treatment of services and products<sup>13</sup>. By promoting fair competition, the DMA seeks to help smaller tech companies and startups innovate and develop new technologies, which can be integrated on larger platforms. Alongside the benefits of the Data Act, the DMA's regulations on data usage and sharing also want to ensure that smaller companies can benefit from data-driven innovations, crucial for productivity and societal advancements like AI and quantum computing<sup>14</sup>.



The EU's data shift is just an example of the European attempt to leverage technologies to increase citizens' wellbeing, while responding to security questions in ensuring that European values and rules apply also in the digital space<sup>4</sup>, contributing to thriving democracies. Nonetheless, **implementation and enforcement will be key elements** in ensuring that European regulations work for people and do not only pose additional regulation stifling innovation, and to avoid companies' attempts to evade compliance.

President Trump has repeatedly **supported Big Tech's criticism of European regulations** and announced that he would 'consider' tariffs to respond to European regulations to defend American tech companies<sup>16</sup>.

This is particularly important given the pushback of Big Tech in the US, which have expressed strong opposition to some of the measures<sup>15</sup>. President Trump has repeatedly supported Big Tech's criticism of European regulations and announced that he would 'consider' tariffs to respond to European regulations to defend American tech companies<sup>16</sup>. While this is only one example of where the EU and US might increasingly diverge on technological developments, the EU's ability to respond by keeping an **open dialogue with partners while ensuring that its own rules are implemented** for the benefit of its citizens and businesses is crucial for its digital leadership<sup>7</sup>. Forums such as the EU-US Trade and Technology Council could serve as a platform for this, even in an increasingly contested framework.



# THE EU-US TRADE AND TECHNOLOGY COUNCIL<sup>17</sup>

The EU-US Trade and Technology Council was founded in 2021 as a forum for the US and the EU to cooperate on the technological and industrial leadership of both powers **based on shared democratic values, to ensure that trade and technologies serve societies and economies, and to expand bilateral trade and investment.** Cooperation and trust between the powers are crucial, considering that the EU and US are deeply economically interconnected, sharing a €1.6 trillion trade relationship in goods and services (2023)<sup>18</sup>. Common priorities for cooperation on critical and emerging technologies and defending common values are agreed upon by representatives from both parties. During the sixth ministerial meeting held in Leuven, Belgium, on April 4-5, 2024, the EU and the US agreed to deepen cooperation

on AI and 6G technologies to establish global standards through their technological leadership<sup>19</sup>.

Amongst its achievements, the Council led to cooperation on policy priorities such as **the early warning mechanism on semiconductor supply chain disruptions** and their effects on the availability of critical raw materials. Nonetheless, more concrete achievements on technological advancements – for instance in regulating AI – are still to be seen.

Indeed, amongst the most pressing challenges that the Council faces are differing regulatory approaches and political dynamics, which are only set to diverge further under the current Trump administration. In particular, the EU's

governance rules for online content on social media platforms and digital services, as well as the EU's antitrust regulations seen to be targeting major US tech companies, and data flows between the EU and the US are contentious aspects in the relationship<sup>20</sup>.

This makes the future of the TTC uncertain, with some possibility that it might be suspended. Nonetheless, some experts suggest that even with diminished cooperation space, restructuring the TTC to adapt to the new EU-US relationship could allow for joint work on aspects such as de-risking supply chains and diversifying clean technology supply chains from dominant market players such as China<sup>21</sup>.



Still, looking within the bloc the benefits of technologies that work for people are hindered **by low levels of digital skills** among European citizens and **low rates of technology uptake by businesses**. These two elements are closely linked and essential for Europe's digital future. For businesses to stay competitive globally, adopting technologies like cloud computing, social media, AI, e-commerce, and automation is crucial. This will be important not only on an international level but also within the EU to close gaps, promote innovation, and improve quality of life and job opportunities, especially in rural areas and regions with aging populations.

In turn, these developments lead to a growing demand for employees with digital skills to work in technology-driven environments. In 2021, the Commission noted that more than 70% of businesses reported that **lack of staff with adequate digital skills** was an obstacle to investment<sup>3</sup>. More European citizens need basic digital literacy to fully participate in and benefit from the advantages of a digital society, and for the digital transformation to be **a fair one that leaves no one behind**. This requires a significant focus on developing digital skills across Europe<sup>4</sup>. Recognising this challenge, the von der Leyen II Commission has included several non-legislative proposals to foster skills development in its 2025 annual work programme.

During the sixth ministerial meeting held in Leuven, Belgium, on April 4-5, 2024, the **EU and the US agreed to deepen cooperation on AI and 6G technologies** to establish global standards through their technological leadership<sup>19</sup>.



# MORE DIGITAL SKILLS FOR EU CITIZENS

Developing the skills of European citizens to make them fit for the digital age has a significant impact on Europe's economy and on general wellbeing. Yet, a study (2020) suggested that while 90% of jobs require at least basic digital skills, only 45% of Europeans currently possess them<sup>4</sup>, leading to a gap that can hinder the EU's fair digital transformation.

The main framework guiding the digital skills uptake in the EU is **the Digital Decade Policy Programme**, outlining **targets for the EU**, including:

The EU has invested almost €300 million to support initiatives aimed at skilling, upskilling and reskilling the EU's workforce<sup>22</sup>. The Digital Education Action Plan (2021-2027)<sup>23</sup>, for instance, supports the development of progressive digital education and aims to promote the competences necessary for the digital transformation. Similarly, the European Skills Agenda includes actions to ensure that European citizens have the skills to respond to digital changes in the job market<sup>24</sup>. Skills development has been mainstreamed in programmes such as the European Data Strategy, the European Industrial Strategy or the European SME strategy.

Skills are also at the heart of the new Commission's mandate through initiatives such as the Union of Skills<sup>25</sup> – published in March 2025 - and the Quality Jobs Roadmap<sup>26</sup>, that will be presented at the end of 2025, both of which aim to increase skills development for fair job transitions and better employment opportunities for EU citizens. This aims to close the gap in skilled workforce for businesses, contributing to productivity and competitiveness of European businesses in the digital sector. Nonetheless, more investment in skills development is needed to meet the 2030 targets for a competitive digital economy<sup>2</sup>.

**20 MILLION  
ICT SPECIALISTS  
BY 2030**

**10.9 MILLION  
DATA PROFESSIONALS  
ACROSS EU MEMBER  
STATES BY 2025**

**80%  
OF THE POPULATION  
POSSESSES BASIC  
DIGITAL SKILLS<sup>3</sup>**



# LEVERAGING THE POTENTIAL OF A COMPETITIVE DIGITAL MARKET

European businesses are facing multiple and interlocked challenges stemming from shifting global realities and internal obstacles to competitiveness. These include unfair competition from other global powers, high energy costs caused by dependencies amidst heightened security challenges, labour and skills shortages, access to capital, and complex regulatory hurdles and red tape. Additionally, the low diffusion of digital technologies has a significant impact on businesses' ability to develop new business models<sup>14</sup>.

## IN NUMBERS<sup>2</sup>:

IN 2020, THE EU SET SEVERAL TARGETS FOR ITS BUSINESSES TO ACHIEVE BY 2030:

- 1 75% OF COMPANIES & 90% OF SMES SHOULD USE CLOUD-COMPUTING SERVICES, BIG DATA AND AI
- 2 MORE THAN 90% OF SMES SHOULD USE SOCIAL MEDIA OR RELY ON E-COMMERCE FOR AT LEAST 1% OF SALES
- 3 THE NUMBER OF EU HIGH-VALUE STARTUPS SHOULD DOUBLE.

UNTIL 2024, THERE WAS STILL LIMITED PROGRESS – FALLING SHORT OF THE TARGETS SET.

- 1 CLOUD-COMPUTING SERVICES USE INCREASED ONLY BY 7% AMONGST BUSINESSES
- 2 THERE WAS NO NOTICEABLE CHANGE IN THE ADOPTION OF AI
- 3 ONLY 2.5% MORE SMES INCREASED DIGITALISATION
- 4 THERE WAS A LIMITED INCREASE IN THE NUMBER OF HIGH-VALUE STARTUPS, ONLY 5.6%.



# SUPERCOMPUTERS AND QUANTUM COMPUTING

In the past years, the European Commission has launched numerous initiatives tailored to increase the EU's economic security through technological development. These policies allocate funding to research and pan-European cross-sectoral partnerships and invest in SMEs with high potential to **create a business environment that can develop and deploy key technologies**. Increased digital capabilities, including industrial data spaces, computing power, and increased European presence in the value chain of key technologies such as semiconductors, can promote a resilient and more competitive European economy<sup>14</sup>. Semiconductors, quantum computing and AI are examples of critical technologies in which the EU is investing significant funds to increase competitiveness.

The EU is currently home to 3 out of 10 most powerful supercomputers in the world<sup>3</sup>. According to some research, the EU is the third power globally in terms of share of value added in quantum related products, after the US and China. Nonetheless, the European quantum industry is largely based on smaller startups, which face significant obstacles in raising private investment and receive less public investment than their Chinese or US counterparts. For indication, the US has committed about €4 billion for quantum projects while China expected to invest at least €14 billion over the next five years<sup>27</sup>.

Through flagship research and development programmes, the EU has demonstrated an intention to invest in technologies that can help process increasing amounts of data. Through the European High

Performance Computing Joint Undertaking (EuroHPC JU)<sup>28</sup> for instance, the EU and participating countries have invested over €7 billion for the 2021-2027 period<sup>29</sup> in the **development of computing infrastructure** accessible to users and industry in the EU. Additionally, the Quantum Technologies Flagship<sup>30</sup> launched in 2018 allocated €400 million to more than twenty projects as part of a long-term **research initiative** to increase and consolidate European scientific leadership in quantum technologies.

Building upon existing policies, the European Commission is also expected to publish a new Quantum Strategy and a Quantum Act in 2025. The new initiatives aim to build European capacities in the development of quantum technologies and of devices and systems based on them<sup>14</sup>.



Overall, a picture with mixed results emerges: The EU is a leading power in research, development and scientific performance – where it is in line with the US and China - but weaker than other powers in manufacturing and commercialization<sup>27</sup>, hosting **fewer and smaller companies that can develop and deploy technologies**. Research has shown that the EU is falling behind in hardware developments as well as in the construction of centralized facilities where chips and market applications can be manufactured<sup>27</sup>

The first challenge that European companies face is investment. According to research<sup>31</sup>, over the past decade, the EU has invested significantly in the digital sector, with total funding being 10 times higher than in the previous decade, from €39.3 billion to €389.3 billion. For indication, in 2024 the EU was

expected to invest €41 billion – exceeding the compounded investments of 2009-2014. Nonetheless, this is still a relatively small amount when compared to the US total of €1.1 trillion invested over the past decade.

Over the past 10 years, the growth-stage funding gap between the US and the EU was equal to €343 billion and European startups were half as likely as US counterparts to secure large funding. While there have been some improvements in investment, **smaller, more fragmented and risk adverse capital markets** are still hindering the development of technologies to the same extent as the US or China. European SMEs tend to scale up less than their counterparts and often relocate to the US, where market size and funding at the growth-stage - such as venture capital - are more easily available.

## INVESTMENTS IN TECHNOLOGIES

The EU's advancement in technologies has been supported through key investments from numerous funds such as the Recovery and Resilience Facility, Horizon Europe, InvestEU, Connecting Europe Facility (CEF-Digital) and DIGITAL<sup>2,32</sup>. The Strategic Technology for Europe Platform (STEP) facility has been crucial in pooling resources from across these programmes for digital technologies and deep-tech innovation, clean and resource-efficient technologies, and biotechnologies.

In 2024, €15 billion from across the funds was allocated to these critical priorities<sup>33</sup>.

Member States have also contributed with key investments of EUR 251.9 billion<sup>2</sup>, including in semiconductors (EUR 40 billion), connectivity (EUR 29 billion) and measures for competitiveness (EUR 56.8 billion), technological leadership (EUR 22.3 billion), and cybersecurity (EUR 5.9 billion)<sup>2</sup>.



An example to highlight this is the **semiconductor industry**, a priority for the EU. Semiconductors are essential components across technologies in all industries, but the EU is highly dependent on chips fabricated in third countries – predominantly Taiwan – making it highly vulnerable to disruptions in the supply chain<sup>34</sup>. According to 2024 research, Taiwan was producing 60% of all chips worldwide and 90% of the most advanced ones<sup>35</sup>, while only 10% of the semiconductors on the European market were European made<sup>3</sup>.

Alongside Taiwan, the US is currently a global leader in chip design and advanced manufacturing technologies, with the 2022 US Chips Act having played a key role through subsidies, tax incentives, and funding for research and development for the technology<sup>34</sup>. The US has also recently announced a potential deal with TSMC, the world's leading semiconductor manufacturing company. Under the deal, TSMC would invest an additional \$100bn in the US for

the construction of five new facilities to produce the most advanced chips<sup>36</sup>. The new Trump administration's shift towards protectionist measures also underlines the need for the EU to increase its investment in critical technologies.

To respond to these challenges and increase European manufacturing capacities, the EU has allocated significant amounts, most notably through the **European Chips Act**<sup>37</sup> and the **Chips Joint Undertaking (Chips JU)**. To double the global semiconductor market share to 20% by 2030<sup>38</sup>, the Chips Act mobilises €43 billion in public and private investment, including €3.3 billion from the EU budget, while the Chips JU supports innovation in manufacturing with €11 billion, including €4.2 billion from the Commission's budget<sup>39</sup>. Nonetheless, some have observed that the initiatives are primarily redirecting existing investments from other EU-funded programmes<sup>34</sup>, and have called for more dedicated allocations.



The upcoming negotiations on the next EU long-term budget, **the Multiannual Financial Framework (MFF) post-2027**, present an opportunity to reiterate that investments in the EU's digital future are crucial and to mobilise funds from the EU budget. In the first Communication on the next MFF, the European Commission has already signalled that the digital transition will be a key priority, with scope for increasing EU spending to foster investments<sup>40</sup>. Alongside this, investment is expected to be boosted through measures for an easier implementation of the InvestEU programme and the European Fund for Strategic Investments, as underlined in the Commission's 2025 Work Programme<sup>14</sup>.

Indeed, investment is not the only challenge for EU companies: Research has shown that a fragmented and complex regulatory system is still a key obstacle to the development of competitive technological industries<sup>27</sup>. This fragmentation can increase administrative burdens for smaller companies, hinder growth and the scale-up that European industries need to become strong international actors in the digital future. To build a strong industrial base, regulatory certainty through **simplification** is therefore crucial.

Simplification has become a buzzword of the new European Commission, as an underlying priority to increase the functionality of the internal market and support SMEs. The nomination of a Commissioner for Implementation and Simplification and a Commissioner for Startups, Research and Innovation are both positive indications of the relevance of strengthening European SMEs for the digital future of the EU. Additionally, the Communication on Implementation and Simplification clarifies that addressing the regulatory burdens of reporting obligations, recurring administrative costs and compliance costs, when possible, is expected to have positive repercussions for European tech startups and companies in their bids to become globally competitive<sup>41</sup>.

The European Commission has already signalled that **the digital transition will be a key priority**, with scope for increasing EU spending to foster investments<sup>40</sup>.



# SIMPLIFICATION FOR THE EU'S DIGITAL FUTURE

Simplification is at the heart of the new European Commission's mandate, as highlighted by the policies in the 2025 work programme for the Commission. While no initiative explicitly addresses tech or digital SMEs or startups, the benefits deriving from the elimination of barriers, better application of existing rules and easier reporting requirements can have a positive effect on startups and scaleups working on key technologies operating in the internal market. **Amongst the notable proposals that the Commission is expected present this year:**

**Omnibus packages and simplification proposals**, to promote simplification by addressing overlaps between different regulations. Crucial for SMEs in the digital sector is the Omnibus package on **investment simplification** facilitating investments under InvestEU and the European Fund for Strategic Investments, which was presented in February 2025<sup>42</sup>. The Omnibus package on **small-mid caps** (Q2 2025), adapting reporting requirements for small mid-caps, and the **Digital Omnibus package** (Q4 2025), simplifying cybersecurity legislation and reassessing data laws for better data sharing<sup>41</sup> will also be relevant proposals.

**EU Startup and Scaleup Strategy** (Q2 2025), addressing challenges in accessing capital, markets, services, capital, infrastructure and talent. By tackling these challenges through legislative proposals, the Strategy aims to close the innovation gap between the EU and its competitors, promoting competitiveness<sup>43</sup>. One of the legislations expected is the **European Innovation Act**, facilitating access to capital and supporting companies in testing new solutions and technologies<sup>44</sup>. Another widely mentioned proposal is the creation of a **28th regime**, an EU-wide alternative to 27 different national regulatory systems<sup>43</sup>.

**Single Market Strategy** (Q2 2025), presenting policies to help SMEs and startups to grow. These include the creation of a European venture capital fund supported by the EU budget, simplified VAT regulations and lower company registration costs<sup>45</sup>.



# TECHNOLOGIES FOR THE FUTURE OF EUROPEAN SECURITY

## Increasing connectivity as an underlying goal

For the cooperation that underlies many of these initiatives, **connectivity** plays a central role. Connectivity for the EU includes refers to the development and deployment of critical infrastructures, such as – from Gigabit connectivity through 5G and 6G networks. These infrastructures can help – to increase the data flow, connect more services to the Internet, and therefore increase the possibilities for collaboration.

The **Gigabit Infrastructure Act**, which entered into force in May 2024, works towards this by increasing the deployment of advanced gigabit networks, addressing

regulatory process and reducing administrative burdens<sup>46</sup>. Additionally, the European Commission is accelerating multi-country projects that combine investments from the EU budget, Member States, and the private sector to develop digital infrastructure.

The proposed **Digital Networks Act** (Q4 2025) will also contribute to stronger cross-border connectivity and coordination, strengthening the presence of the high-capacity digital infrastructure underpinning a strong digital economy<sup>14</sup>.



With heightened security challenges at its borders, the EU's digital transition inevitably encounters security questions. Especially within the mandate of the new Commission, this is expected to take central stage in the digital future of the EU. Firstly, it has become evident that for the EU's energy security and its clean energy ambitions, greater resilience

through a stronger role in supply chains is necessary. This resilience can be achieved by advancing European technologies. Secondly, in the past years the EU has repeatedly experienced the effects of cybersecurity attacks and disinformation on its democratic resilience, underlining the importance of securing technologies for strong democracies.



Many of the technologies that the EU is investing in to increase its economic competitiveness are dual-use, meaning that they can be used for both civilian and military applications. For instance, the processing power of AI and quantum computing can help increase the speed with which military researchers can address complex challenges and revolutionise analysts' ability to predict scenarios. Applications of AI to autonomous systems such as drones and robots can furthermore improve defence capacities and help the EU respond to different threats<sup>47</sup>. As the EU and its Member States are increasingly committing to substantial investments to boost security, there is a potential for increased allocation of funds to critical technologies can ensure positive developments for European defence as well.

According to research by the European Commission, the European defence industry, including SMEs, has an annual turnover of around €700 billion and employs over 500,000 people<sup>48</sup>. As a key driver of technological innovation and resilience, the so-called European Defence Technological and Industrial Base (EDTIB) requires dedicated and collaborative investments to ensure that the full joint European defence readiness potential is achieved. As private tech innovators are leading in the development of military innovation<sup>47</sup>, supporting these key actors has become a priority for the future of European defence technologies.

The European Union has dedicated funds of the development of European defence technologies based on the investment gaps identified by the Commission in a 2022 report<sup>49</sup>. **The European Defence Fund (EDF)**, for instance, aims to fund cutting-edge and interoperable defence technologies through an allocated budget of over €7 billion for 2021-2027<sup>50</sup>. Furthermore, the Fund aims to increase cooperation between industries and governments, as well as across countries for collaboration. Other funds, such as the European Defence Industry Reinforcement through common Procurement Act (EDIPRA), also contribute to similar cooperation for joint projects<sup>51</sup>.



## THE EUROPEAN DEFENCE INDUSTRY, INCLUDING SMEs, HAS

**€700 BLN**  
ANNUAL TURNOVER

**500,000**  
PEOPLE



Indeed, some have observed that one of the main challenges to progress in joint defence technological developments is the industry's fragmentation, with national interests, red-tape and bureaucratic challenges posing significant obstacles to cooperation. For this reason, initiatives such as the European Defence Industrial Strategy (EDIS) have centred on reducing fragmentation in defence to increase the value of intra-EU defence trade by increasing European cooperative investments also in critical technologies<sup>48</sup>.

One concrete area in which the EU is focusing its attention is **cybersecurity**, which is crucial for the EU's digital future. As cyber warfare becomes an increasingly present threat, defending critical technologies has become a priority for the European Commission. **Investing in cybersecurity capacities** is central from both a **defence and a strategic independence perspective**. They can increase European response capacities to diverse hybrid threats and to ensure the resilience of its digital infrastructure, services and communication networks.

The European Commission has been investing in cybersecurity through several funds. **The Digital Europe Programme**, for instance, has allocated almost €1.6 billion for the development and deployment of cybersecurity capacity for the period between 2021 and 2027. It aims to ensure stronger infrastructures across the EU and other sectors, from public administration to businesses and individuals<sup>52</sup>. Furthermore, through the **Horizon Europe**, the EU has allocated €49 million for research and innovation in cybersecurity and privacy systems<sup>52</sup>.

Beyond investments, better understanding cooperation synergies to respond to cyber threats is a crucial aspect of the European efforts on cybersecurity. In February 2025, the European Commission presented a **new proposal for a Cyber Blueprint**. The Blueprint aims to enhance the EU's cybersecurity crisis management framework by defining the roles of relevant EU actors and increasing cooperation to respond to cybersecurity-related crises<sup>53</sup>. It covers preparedness, shared awareness to anticipate cyber incidents, detection capabilities, and response and recovery tools to manage, prevent, and control them.

The Digital Europe Programme, for instance, allocated almost **€1.6 billion** to the development and deployment of cybersecurity capacity for the period between 2021 and 2027.



Indeed, concerted action with other international actors, such as NATO, will be a crucial aspect of the EU's digital future, especially in relation to emerging and disruptive technologies. The **EU-NATO strategic partnership** already focuses on strengthening cooperation to counter hybrid threats, as well as exchanging information and good practices on cyber capacity building<sup>54</sup>. Since 2023, additionally, the EU and NATO have announced in a Joint Declaration that they would deepen their collaboration on **emerging and disruptive technologies**, including AI, cloud computing and quantum technologies. Several Member States that are also NATO members have been actively participating in initiatives such as the Defence Innovation Accelerator for the North Atlantic (DIANA) and the NATO Innovation Fund, both of which were launched by NATO to accelerate innovation through investment in critical technologies<sup>55</sup>. While distinct, the EU and NATO efforts share multiple communalities.

These include investing in the private sector, which is seen to be driving technological innovation, and fostering strong synergies between public authorities, the private sector and academia to fully exploit the dual-use potential of technologies, meaning their application in both civilian and military contexts<sup>56</sup>. The strong alignment has the potential to promote joint responses to new security challenges through the development of new technologies. Nonetheless, this will rest on continued high-level political commitments and significant investments.





# ARTIFICIAL INTELLIGENCE:

## *Enjoying the benefits while upholding fundamental rights*

Artificial intelligence (AI) is one of the most discussed technologies, and in many regards, its development and future regulation at the European level represents the challenges and opportunities of the digital transformation in general. The EU's approach aims to combine leading R&D and industrial capacities with a steadfast safeguard of fundamental rights that remains unmatched to this day.

### Challenges

According to research, the EU has a relatively high share of the global AI-related products and services, and leading the development of business-to-business (B2B) AI applications alongside the US<sup>27</sup>. Nonetheless, in the earlier stages of developments, the EU is notoriously absent: It lags behind the US in the development of semiconductors and advanced processing units, and does not have the same data centre and supercomputing capacities<sup>27</sup>.

This is largely due to a **lack of access to private investment and venture capital for startups and scaleups**. Some numbers suggest that the investment gap between the

US and the EU was around \$120 billion vs \$18 billion between 2018 and 2024<sup>57</sup>. While the EU has increased its investments, European startups cannot rely on the same big tech platforms with the market scale to reduce the fixed costs of training generative AI as their counterparts in the US<sup>58</sup>. This makes it hard for European businesses to move from research to market-ready solutions<sup>27</sup>. Additionally, the **complex EU regulatory framework** for data processing makes it more difficult for European companies to use the necessary data to train AI systems<sup>58</sup>. This has been leading many European startups to turn to the US markets for private equity and venture capital.

The investment gap between the US and the EU was **around \$ 120 billion vs \$ 18 billion** between 2018 and 2024<sup>57</sup>.



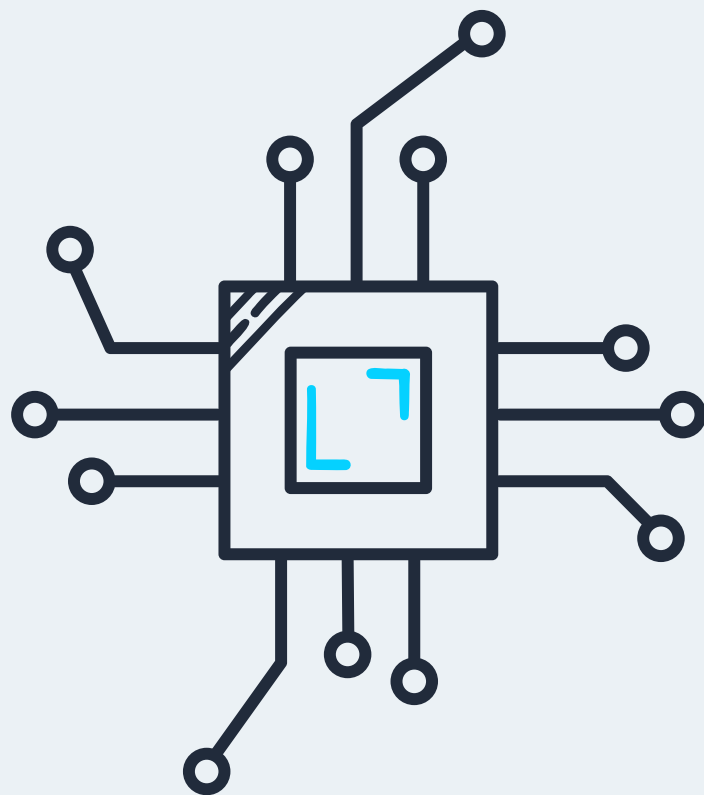
## Opportunities

In response to these challenges, the European Commission has recently announced significant investments. In January 2024, the EU introduced measures to increase funding for European startups and SMEs developing AI through the Horizon Europe, Digital Europe, EIC accelerator and InvestEU programmes<sup>57</sup>. Furthermore, in February 2025, the EU announced a new InvestAI initiative to allocate €200 billion to AI, including €20 billion in AI gigafactories<sup>59</sup>. The upcoming AI Continent Action Plan, to be presented by the Commission in Q1 2025, is also expected to support the development of AI Factories for a competitive ecosystem<sup>14</sup>. Yet, it is still unclear whether the promised investments would be enough to close the investment gap with other global powers such as the US.

A potential bet for the EU is to continue strengthening its focus **on specific AI applications derived from the big models**<sup>58</sup>. This could allow for the creation of a thriving SME and start-up environment focusing on the creation of better products and services for citizens. Examples are the healthcare sector, high-tech and banking. This focus would allow European startups to avoid model training costs while making it easier to apply derived models in service markets with a demand for specific applications<sup>50</sup>. The EU's strong regulatory framework in data protection and reputation for ethical and sustainable technology can help it stand out in the application of AI to regulated areas like healthcare and finance<sup>60</sup>. The **Apply AI Strategy**, which the Commission is expected to present in 2025, will likely provide strong support for this goal by focusing on the development of industrial uses of AI for the delivery of public services, enabling EU companies to be global front-runners<sup>14</sup>.







## The Unique European Way

In fact, the protection of individuals and data plays a central role in the EU's approach to AI. In 2024, the EU presented the AI Act, the world's first framework to regulate the AI by addressing the potential economic and societal disruption that its development poses. The Act, which will be fully enforceable by August 2025, regulates the AI development and use based on different risk levels and thus sets global standards by prohibiting or limiting certain applications of the technology<sup>61</sup>.

Still, the EU will have to strike a balance between regulation and innovation. The US has repeatedly opposed further European regulation on AI fearing that it would stifle open collaboration and creation. Indeed, under the Trump administration, the US has shown tendency towards de-regulation in favour of innovation and fast-paced growth in the global tech-race. In the beginning of 2025, the Trump administration revoked a

2023 executive order signed by Biden that aimed to address AI risks to workers and consumers and announced a new \$500 billion AI plan to boost US competitiveness. Pressure has also increased on the EU to pursue a lighter regulatory approach to AI, for instance through a flexible implementation of the AI Act. Recently, the EU announced that it was going to withdraw the **AI Liability Directive**, which laid down common rules for aspects of non-contractual civil liability for damage caused by AI<sup>62</sup>.

For the EU to strengthen its place in the tech race with other global powers, it must prove that it can develop AI that empowers individuals and supports workers, that is ethical and secure, and that companies that comply with the EU's regulation can become frontrunners in development.



# EMBRACING OPPORTUNITIES FOR EU'S DIGITAL FUTURE

The EU is now at a turning point in its digital future. While in the past years, policies and investments have already laid the groundwork for an innovative digital economy that can become globally competitive, the full implementation of these measures will be crucial in defining the EU's path forward. The current security challenges that the EU is facing, the increasing protectionist measures of the US under the Trump administration, and the US-China rivalry in the digital race, only make the case for technological sovereignty stronger: It is only through the development of its capacities in AI, quantum technologies, digital platforms and other critical technologies that the EU can ensure to become a leading actor and set its own standards in the global digital race.

While challenges remain the current policy and political framework is rich in opportunities that can set the course for the European digital future.



**The current security challenges that the EU is facing, the increasing protectionist measures of the US under the Trump administration, and the US-China rivalry in the digital race, only make the case for technological sovereignty stronger.**



## 1 INCREASED INVESTMENT FOR INNOVATION

The EU must continue investing in its critical industries and infrastructures and enable more private investment, to fully take advantage of its technological sovereignty. Alongside industry, **investing in skills development is the key to a strong and competitive digital economy** that leaves no one behind.

## 2 SIMPLER RULES FOR EUROPEAN BUSINESSES

The EU must continue supporting innovative startups in scaling-up, developing and marketing technologies such as AI, quantum computing or health and clean energy technologies. **Simplification, fostering EU-wide cooperation, strengthening public-private partnerships, and revising the existing challenges for an integrated internal market are central tenets** in supporting an innovative digital ecosystem.

## 3 STRONGER STRATEGIC PARTNERSHIPS

Amid global challenges, **the EU must continue strengthening its strategic partnership with like-minded partners**. This can enhance innovation and technological developments and allow to foster synergies to tackle global challenges jointly.

## 4 ENSURING THAT TECHNOLOGY RESPECTS EUROPEAN VALUES

The EU must continue ensuring that technological developments must continue to go hand in hand with strong democratic safeguards, upholding European values. **Digital technologies must still protect people's rights and be safe and secure**. Technologies should promote the empowerment of citizens and businesses alike while ensuring that their protection, with clear rules that are followed by all.



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