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RETHINKING STRATEGIC AUTONOMY IN TIMES OF NEXT GENERATION EU: NEW DIGITAL AGENDA

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Abstract: *The digital transformation of the global economy and society has accelerated after the Covid-19 pandemic. The European Union (EU), compared to China and the United States, is losing its capacity for innovation and control over data and fundamental raw materials and could even lose ground in the regulatory power it has in the digital realm. This paper pays special attention to the situation and progress toward a new European policy to achieve digital strategic autonomy. It also briefly outlines the Recovery Plan for Europe as a possible incentive for its promotion. Both descriptive and analytical methods were employed to gather the data from secondary sources and provide reliable research results. The major findings of this article are that strategic autonomy is an imperative requirement for sustaining and encouraging European integration, forcing the EU to advance faster toward developing critical digital technologies. There is also an urgent need to secure critical parts of supply chains and data protection, intellectual property, and defense against disinformation. Finally, the European Union must improve its resilience to face new crises and lead the digitalization of its economy.*

Keywords: *European Digital Autonomy; R&D; Strategic Pillars; Digitalization; Missions; Next Generation EU*

INTRODUCTION

Strategic autonomy is not defined in any official document of the European Union. Nevertheless, it is reflected, above all, in its Global Strategy for Foreign and Security Policy (EUGS) and in multiple statements of the European leaders. Therefore, it is a relatively new issue that refers to industrial strategy. In this way, it has to make it possible to manage risks relating to supply chains, strategic investments, the strength of the internal market, or the control of future technologies too (Molina and Benedicto 2021).

Additionally, the European Commission (EC) recognized digital policy as one of the key political priorities of its 2019-2024 mandate, pledging for Europe to have technological sovereignty in critical areas. In other words, the ability to make "autonomous technological decisions" and the ambition to shape rules and standards at the international level (Moghior 2022). The EC welcomes the idea of strategic autonomy referring to the ten key areas of action in which the European Union can seize opportunities "for its global leadership and open strategic autonomy" (European Commission 2021b), together with highlighting the green and digital conversion and speaking of "strengthening resilience and open strategic autonomy in critical sectors for the double transition through, for example, the work of the EU Observatory of Critical Technologies, or the common agricultural policy to ensure food security" (European Commission 2022).

If we apply strategic autonomy to digitalization in Europe, its industrial dimension must cover economic, technological, and military needs. The operational aspect refers to the resilience of critical infrastructures and information and communication technology (ICT) systems against cyberattacks. Weaknesses in these two dimensions can disturb the political autonomy of the Member States (MS), that is, the ability to make decisions freely and independently. Due to risks such as electoral interference, espionage, or dependence on imports of raw materials, components, and equipment expose the European Union, its MS, and companies to supply chain disruptions, coercion, or sabotage by foreign forces. That fragility can also erode the EU's ability to shape international rules, norms, and standards that reflect its interests and values.

As a consequence, the buildout of basic and emerging digital technologies such as 5G, Artificial Intelligence (AI), high-performance computing, advanced robotics, or virtual reality, which will have an increasing impact on all sectors of the economy, the labor market and society as a whole, becomes a key aspect for the future of the European Union.

Considering the mentioned issues, the main objective of this research was to study the situation and progress toward European digital strategic autonomy. Furthermore, its development allowed it to meet its secondary goals. On the one hand, underline the status of the European investment in research and development (R&D) and the strategic pillars that the EU must face to achieve such autonomy. Also, emphasize the necessity for Europe to accelerate its digitalization and the mission model created by the European Commission. The research also briefly outlines the Next Generation EU (NGEU) as a possible incentive for promoting European digital autonomy.

Finally, the carried-out study has been based on the deductive research model (Woiceshyn and Daellenbach 2018). Descriptive and analytical methods were used, collecting the data from secondary sources and providing reliable conclusions for the research.

INVESTMENT IN R&D AND THE STRATEGIC PILLARS

Analyzing the economic data, we see that the investment in R&D at the global level has increased for the eleventh consecutive year (Joint Research Centre 2021). According to the R&D indicators of 2020, the 2,500 companies, which are examined worldwide, invested 908,900 million euros, 6% more than in 2019. Likewise, enterprises in China showed double-digit R&D growth (18.1%), and the United States (US) grew at 9.1%, while those in the European Union decreased R&D by 2.2%, compared to the 5.6% increase in 2019. Regarding the participation of the EU companies in global R&D, this decreased to 20.3% (in 2019, it was 20.9%) (Joint Research Centre 2021), while the US companies did so to 37.8%. However, Chinese companies raised their share, reaching 15.5% (from 13.2% in 2019).

Accordingly, Europe should be faster in developing, adopting, and diffusing critical digital technologies (such as Artificial Intelligence, quantum computers, or 5G), which will play an increasingly central role in economic and military developments. Member States must jointly invest in the leading emerging technologies to compete on equal terms with China and the United States (European Commission 2019). EU digital autonomy is necessary for strategic economic autonomy and to achieve strategic sovereignty (Shapiro 2020). Without a strong

industrial base built on technology, it will be difficult for Europe to shape global affairs in economic and defense terms.

R&D and its proximity to digital technology are also reflected in patent analysis (World Intellectual Property Organization 2021). In the European Union, patent applications fell by 0.6% (from 181,479 patents in 2019 to 180,346 in 2020), unlike in China, where the increase between 2019 and 2020 was 6.4% to reach one and a half million. Almost twice as many patent applications as the second most active country, the United States, with 597,172.

Globally, patent offices located in Asia received nearly two-thirds (66.6%) of all applications filed worldwide in 2020. A considerable increase was driven mainly by long-term growth in China. Meanwhile, the offices located in North America recorded 19.3% of the global total of applications, in the time those in Europe more than a tenth (10.9%).

Focusing on the technological field, we can differentiate three pillars of particular importance that the European Union must urgently address. The first is R&D in Artificial Intelligence and 5G. A field in which Europe has lagged behind its two main competitors, China and the United States. The second is the need to secure critical parts of supply chains. We mean raw materials and rare earth elements. Finally, creating a digital future to protect European citizens from disinformation and attacks by foreign agents and to achieve sustainable economic growth thanks to advances in the field.

Artificial Intelligence and 5G

Artificial Intelligence is a combination of technologies that brings together data, algorithms, and computing power. Its rapid progress makes it a powerful tool economically, politically, and militarily (Miailhe 2018). It is also at the heart of the national security strategies of the Member countries, as well as rooted in the dynamics of global geopolitics. Although European funding for research in Artificial Intelligence has increased in recent years, this investment is lower than that in the United States or China (European Commission 2020a). However, according to the European Data Strategy, the EU can combine its technological and industrial potential with a high-quality digital infrastructure and a regulatory framework to become a world leader in innovation in the data economy and its applications. To do this, it needs to increase its investment levels significantly. Developed with Member States, the Coordinated AI Plan is a good starting point for closer cooperation on Artificial Intelligence in Europe and for creating a symbiosis that optimizes investment in the relevant value chain.

The 5G supply chain comprises a large number of actors from different countries, with various ethical and qualitative standards of cybersecurity and data protection. Only two companies from the European Union (Ericsson and Nokia, which cannot compete on price with China's Huawei) are among the top 10 economic organizations with the most 5G patents. It accounts for just 1/7 of all 5G patents worldwide, as well as is failing to reach a consensus on "whether [mobile operators] should give in to United States demands to exclude leading equipment supplier Huawei and other Chinese suppliers" (Mukherjee and Binnie 2020). The pandemic has also slowed down the auctioning of the 5G spectrum, while the EU still cannot guarantee a fully European value chain. In short, "unless Europe moves quickly, it risks losing

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growth and weakening industrial competitiveness in manufacturing and logistics that could cost billions of euros in new wealth" (Mukherjee and Binnie 2020).

In fact, in March 2019, the 27 Member States, concerned about the security of 5G networks, adopted a Regulation on network cybersecurity. Each member then completed a national risk assessment of their 5G network infrastructures and transmitted the results to the European Commission and the European Union Cybersecurity Agency (ENISA), publishing a report on the main threats and interveners, the most sensitive assets and the main vulnerabilities affecting the Union's 5G networks.

Beyond any doubt, ensuring the cybersecurity of 5G is certainly a way to strengthen technological autonomy. Given the importance of infrastructure for future technologies, its deployment must be carried out quickly and safely in all Member States. The resilience of 5G will have repercussions on digital communications, critical sectors such as energy, transport, banking and health, and industrial control systems.

We cannot forget that Europe is slowly developing, adopting, and diffusing disruptive innovations. Its shortcomings in some value chains and critical digital technologies could cause further delays in applying technologies such as Artificial Intelligence or 5G, which will play an increasingly central role in economic and military developments (European Commission 2019). Member States must pool resources and complement each other in the key value chains. Joint and ambitious investments in these emerging technologies (Artificial Intelligence, quantum, next-generation microchips, or 6G) are needed to compete with China and the United States.

Securing Critical Parts of Supply Chains

The strength of Europe's industrial and technological base banks largely on having reliable access to raw materials, which are vital to the economy and present a high supply risk. The EU heavily depends on international markets in this area, with very limited domestic production. Aware of that exposure, the European Commission has regularly reviewed and updated a list of critical commodities since 2011. The supply of many of them presents a high degree of concentration. Based on their economic importance and supply risk, Europe has examined 83 materials considered critical, assessing that there are 12 fundamental raw materials for the digital economy within its agenda (European Commission 2020b). However, the EU depends not only on foreign raw materials but also on foreign components and technology. This factor increases as it lags in the production of digital technologies. Strategic sectors for the EU's economy include renewables, photovoltaics, wind generators, robotics, construction, automotive, electric mobility, batteries, traction motors, fuel cells, defense and space, drones, and 3D printing. The European Union also does not have the capacity for extraction, processing, recycling, refining, and separation (e.g., lithium or rare earth elements).

This reflects a lack of resilience and a high dependence on supply from other regions of the world. In other words, gaps that affect all industrial ecosystems require adequate inventories to avoid unexpected disruptions to manufacturing processes, alternative supply sources, closer partnerships with key players in the field of raw materials, and attracting investment for strategic developments (European Commission 2020b).

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Access to resources is a matter of strategic security for Europe's ambition, while the Covid-19 pandemic, together with the ongoing war in Ukraine, has revealed how quickly global supply chains can be altered. The EU must act to improve its resilience to face possible future crises and lead the green and digital transformation. The new industrial strategy for Europe proposes strengthening the strategic autonomy for the EU's resilience as mentioned raw materials, lacking diversifying external supply and increasing domestic supply in strategic areas, reducing over-dependence on imports, improving resource efficiency and circularity, including sustainably designing products.

Data Protection, Intellectual Property, and Defense against Disinformation

The European Commission launched the digital goals for 2030 to achieve "a successful digital transformation for Europeans by 2030" (European Commission 2021a). Concerning data protection, the EU has deployed its regulatory power "forcing companies around the world to comply with European privacy practices" through the General Data Protection Regulation (GDPR), the Digital Services Act, and the Digital Markets Act, seeking to "create a safer digital space in which the fundamental rights of all users of digital services are protected" and to "establish a level playing field to encourage innovation (...) and competitiveness, both in the European single market and globally" (Shapiro 2020). Therefore, the European data strategy intends to create a single market guaranteeing Europe's global competitiveness and data sovereignty.

Regarding the defense of intellectual property, in 2020, the Commission adopted an Action Plan on Intellectual property "aimed at helping companies, especially SMEs, to make the most of their inventions and creations and ensure that they can benefit our economy and society" (European Commission 2020d). Its main objective is to shield European companies from foreign interference and acquisitions, especially Chinese ones, "since they benefit from huge state subsidies, (...) the theft of intellectual property, forced transfers of technology and huge amounts earmarked for state-backed research and development" (Oertel 2020) and "enable Europe's digital competitors to access both European technology and digital infrastructure" (Ortega Klein 2020).

Lastly, the EU also approved a Cybersecurity Strategy to strengthen European resilience against cyber threats and to help ensure that all citizens and businesses can benefit from reliable digital services and tools. In addition, the European Commission has proposed cyber resilience of critical entities and networks in the 27 Member States in a coordinated manner to minimize exposure to high-risk providers and avoid dependence on them. Pending and essential steps that will allow the EU to foster its leadership in the field of international cyberspace standards and enhance its cooperation with partners around the world in order to promote a global, open, stable, and secure cyberspace, based on the rule of law, human rights, fundamental freedoms, and democratic values.

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THE STIMULUS FOR DIGITIZATION AND THE MISSIONS MODEL

After analyzing the three pillars that the European Union urgently needs to address in the technological field, from the perspective of strategic autonomy and digitalization progress, it is to be observed that the exposed technological deficits will not only generate economic disadvantages but will also have wider implications on the EU's ability to protect its interests. The Covid-19 pandemic and the ensuing economic crisis have accelerated the development and adoption of digital services at an unprecedented rate. At a time when the need for digital transformation is greater than ever, the policies and interventions that drive it can also be an engine for recovery, growth, and increased global competitiveness.

These technologies require substantial research and innovation investments to be adopted and generate economic or social benefits. Economies of scale are an inherent feature of digital technologies as they crave large amounts of data, users, or connected nodes, which makes any market fragmentation a barrier to the implementation of technologies such as high-performance (or quantum) computing, advanced AI applications or globally competitive cloud services (European Commission 2020c). As previously underlined, Europe's global position in digital innovation is not one of leadership, as China and the United States have an advantage in digital adoption and investment. The Asian giant accumulates almost half of the global venture capital investment in Artificial Intelligence start-ups, ahead of the United States, and both actors are expected to increase public and private spending on digital technologies significantly and AI in the short term, far beyond Europe (Pitchbook Database 2019).

That is why the EU needs to encourage digitalization. The move can come from the Multiannual Financial Framework (MFF) and the Recovery Plan for Europe. These resources could generate a great impact if research and innovation have a clear objective and can mobilize different sectors of society around that purpose. That is how the missions operate, a concept developed by Professor Mariana Mazzucato that aims to promote the model of the Apollo space mission to the Moon as the way forward to develop innovations and spread them in the economy, what she calls a "mission-oriented" approach. For Mazzucato (2019), "a bold approach, a redesign of tools such as tenders", is necessary. Both governments and companies share risks and benefits, with the public sector responsible for fixing and creating markets.

The EU missions aim for innovation and should include citizens in solving major societal challenges and creating a general public expectation about research and innovation. Likewise, we must consider the capacities of the public sector and the instruments necessary to promote a dynamic innovation ecosystem that includes changes and willingness to experiment on the part of officials and help governments work outside their comfort zone. Also, the missions need financing, and for this, the public, private, and third-sector entities must be mobilized, increasing the levels of investment in R&D (Mazzucato 2019). In any case, it should be stressed that the mission-oriented innovation policy is already reflected in the work of the European Commission, in particular on social challenges: "missions that will help direct research and innovation towards solutions to the biggest problems of our time, from the need to fight climate change to the need to build resilient health systems" (Kattel et al. 2018), being a model to follow for other sectors.

THE DIGITIZATION OF THE EUROPEAN ECONOMY AND THE NEXT GENERATION EU

Digitalization, its development, and implementation can modify and influence the productive specialization of States and their economies, particularly within the service sector and its configuration (European Parliament 2022). The continuity of this phenomenon seems to be assured, thanks to the growing global connectivity. Moreover, using data and its treatment as a product and service opens many possibilities for improving the competitiveness of business entities and sectors (Van Dijck 2014). Nevertheless, digital transformation has become a challenge for the European Union. The deep recession resulting from the Covid-19 pandemic and the ongoing conflict in Ukraine has accelerated certain technological trends and exposed the weaknesses of the EU and its countries.

In this way, the Multiannual Financial Framework for the 2021-2027 period takes European digital sovereignty as one of its priorities by counting with the Digital Europe Programme "focused on building the EU's strategic digital capabilities and facilitating the wide deployment of digital technologies" (Gutiérrez 2020). Endowed with 8,200 million euros, it aims to bridge the gap between research and the deployment of digital technologies, mainly in supercomputing, AI, and cybersecurity.

Also, the launch of Next Generation EU opens a long process of structural reforms and transformation, increasing the degree of fiscal responsibility and commitment to macroeconomic stability, seeking to improve the efficiency, equity, and sustainability of the European economies (Bańkowski et al. 2021). This federalizing and first-rate element, linked to the increase in the EU's resources ceiling and the issuance of the common European debt, aims to distribute its funds among the States according to the degree of need. It is also complemented by national reforms, designed in consonance with each country's economic, political, and social conditions and the agreed recovery and resilience plans. Through its development, the European Commission also stipulated the different areas considered crucial to promote the degree of digitalization of the Member States. Among them, the quality of digital structures, promoting the training of the workforce in the digital context, the development and implementation of new technologies by SMEs, the greater distribution of business size, and the impetus for the degree of digitalization of public administrations of the EU countries (Czubala Ostapiuk and Benedicto 2021).

Nonetheless, there are also countless uncertainties about the potential impact of the Next Generation EU on the European Union. Likewise, the few bibliographic sources offer different attempts at analyzing and referencing this phenomenon (presenting more or less conservative scenarios). In general terms, given that the knowledge about the impact of digitalization on the economy is limited, the European Commission's estimates have been used to try to assess the importance of NGEU funds in the context of the European Union (Janos Varga et al. 2021). Thus, first of all, it is essential to point out a series of simplifying assumptions used by the EC: the total simulated allocation amounts to around 4% of Community Gross National Income (GDP) (with 396 billion euros in grant instruments, following the allocation by country within the Recovery and Resilience Mechanism (MRR); the 166 billion euros are in the form of loans from MRR, following requests from seven Member States (as of July 2021); two temporary scenarios, four years (2021-2024) and six years (2021-2026), are established for all

member countries; the use of all the subsidies of the Recovery Plan for Europe and half of the loans (additional 50%) for productive public investment are perceived, with productivity assumptions according to the literature; all the countries repay the Community debt based on the current quotas of the GDP; the impact of the reforms is not quantified.

Next, considering the above assumptions, a substantial effect of Next Generation EU investments on the growth of the European Union is reflected. For the first scenario, for 2021-2024, we observe an increase in GDP in the EU of 1.5% (in 2024). Meanwhile, in the second scenario (2021-2026), although the growth rate is somewhat lower (1.2% in 2026), it is still important. Moreover, the productivity of public capital causes additional investment to boost demand and increase potential growth, so the European Commission predicts that the supply-side effects will last beyond the implementation of the Next Generation EU (increasing the gross domestic product of the European Union, approximately, by 0.5% even within 20 years). Also, it calculates that NGEU's impact on employment will be 1%, improving labor market conditions and promoting productivity.

After all, despite the discretion about its effects, the information found in the economic literature indicates that this is a very positive scenario, compared to the most conservative estimates, even during the recession (Auerbach and Gorodnichenko 2013). The result is scattered, mainly due to the premature nature of these exercises and the exceptional economic situation. Therefore, the uncertainty regarding its impact is still high and requires future research to complete the exposed vision (Zsolt 2021). What does seem to be clear is that the multipliers of the action undertaken under the Recovery Plan for Europe will be important. Finally, it is worth noting that NGEU forms a coordinated Community response without forgetting the positive indirect effects between the Member States. Therefore, we are talking about a historic stimulus in the context of the European Union, but it is still pending further in-depth studies on its impact.

CONCLUSION

Strategic autonomy is a critical requirement for sustaining and encouraging European integration. Its promotion implies protection and knowing how to project a positive agenda on the world stage, covering the whole of the European Union's action. Further, for autonomy to be viable, the combination of the possession of sufficient minimum resources and the existence of the committed elites is necessary (Puig 1980).

The main objective of this article was to study the situation and progress toward European digital strategic autonomy. The EU must avoid falling behind digitalization as the economic, social, and geopolitical costs can be enormous. Weak technology, critical infrastructure, and over-reliance on imports of key raw materials can affect Europe's political autonomy and global regulatory power. Likewise, Europe has to advance faster towards developing critical digital technologies such as Artificial Intelligence or 5G to compete with two great powers, China and the United States. There is also an urgent need to secure critical parts of supply chains, protect data and intellectual property, and act against disinformation. In addition, for the various European regions to be favored and to achieve cohesion, public

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intervention will be necessary because some of the investments, needing markets and economies of scale, will only be effective at the European level.

The research also briefly outlines the Recovery Plan for Europe as a possible incentive for promoting European digital autonomy. In order to protect its strategic interests, the EU must improve its resilience to face new crises and lead the digitalization of its economy. The impetus can come from a public instrument at the European level. This will require aligning European economies with the objective of digitalization by coordinating financial policy, industrial strategy, innovation policy, and fiscal stimulus. Despite the many unknowns regarding the details of the financing programs or the potential scope of the NGEU implemented measures, among others, it can be said that the magnitude of its actions will be the impact of public investment projects on the general productive capacity of the economy.

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