

# Do EU-funded research networks reinforce strategic autonomy? Evidence from artificial intelligence

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## Extended abstract

Achieving greater strategic autonomy has become a key policy priority for many governments amid rising systemic shocks and geopolitical tensions (Gehrke, 2022). In recent years, these two intertwined trends have laid bare the inherent vulnerability of the hyper-connected economic system that emerged through the Washington Consensus and was characterized by fragmented supply chains, open global markets, and technological optimism (Foroohar, 2023). The tide is now changing, as a varying mix of innovation, industrial, and trade policies is increasingly being mobilized to expand domestic productive capacity and technological capabilities in strategic sectors. In this sense, strategic autonomy can be defined as the capacity of a country or geopolitical bloc to reduce external dependencies in critical areas in order to act (more) independently in the global context (Crespi et al., 2021). A key precondition for the pursuit of strategic autonomy is enjoying a significant degree of technological sovereignty: that is, the capacity to produce scientific and technological knowledge autonomously or to source it from reliable partners (Edler et al., 2020). This applies in particular to a number of new technologies that are expected to capture a growing share of economic value and drive long-term productivity growth in the years to come. The European Commission, through its Strategic Technologies for Europe Platform (STEP), has identified three such technologies where Europe should become less dependent on external partners, both in terms of development and manufacturing: digital and deep technologies, clean and resource-efficient technologies, biotechnologies (European Commission, 2023).

These areas are subject to intensifying geopolitical competition and Europe's technological capabilities appears to lag behind the US and China in several of them (European Commission, 2024). One major

barrier to catching up is the existing fragmentation of Europe's R&I system (Draghi, 2024). This is particularly problematic for at least three reasons. First, the development of knowledge for complex technologies relies on access to and recombination of diverse and geographically dispersed knowledge bases (Balland et al., 2025). Second, the current fragmentation weakens the EU's ability to compensate for the risk of reduced access to external knowledge (Draghi, 2024). Third, it prevents achieving critical mass and scaling up in terms of investment (Bachtrogler et al., 2023).

The paper investigates the influence of interregional research networks on knowledge generation in technological domains that are critical for strategic autonomy. We focus in particular on artificial intelligence as an emblematic strategic technology. Our results indicate that AI innovation outputs at the regional level are positively associated with participation in interregional collaborations. Both the intensity of network engagement and the quality of network positioning, as captured by eigenvector centrality, do exert a positive influence. Overall, these findings shed light on the salience of interregional connectivity in strengthening Europe's technological capabilities in strategic domains.

However, while the benefits associated with network intensity are broadly linear, the advantages linked to network prestige and centrality are more nuanced. In particular, our results suggest diminishing returns beyond a certain threshold, indicating that excessive embeddedness in highly central networks does not necessarily translate into additional AI-related patenting activity. Moreover, interaction terms show that the extent of network effects varies across regions: the impact of AI-related collaborations is stronger in territories with higher income levels, greater innovation capacity and high-tech specialization. Finally, EU-funded AI research networks primarily generate innovation benefits within AI, with spillovers emerging only in technologically proximate domains such as biotechnology and, conditionally, environmental technologies. These spillovers depend more on the intensity of AI research activity than on the prestige or centrality of network connections, and do not translate into broader non-AI patent growth.

Several policy implications can be drawn from these findings. First, EU programmes aimed at fostering interregional innovation collaborations, most notably Horizon Europe, should be further strengthened as part of the broader policy agenda to advance strategic autonomy. In this respect, the European Commission's proposal to increase the future budget of Horizon is consistent with the need to reinforce cross-border knowledge linkages in strategic technological domains.

Second, policy efforts should not only increase the intensity of collaborations but also encourage a wider diffusion of network linkages beyond the current core of highly central hubs. Evidence about diminishing marginal returns related to excessive centrality suggests that overly concentrated network structures may limit additional innovation benefits.

Third, reinforcing interregional innovation networks cannot be pursued in isolation. Network participation and its innovation returns depend on regional framework conditions and absorptive capacity. Policies should therefore continue to address structural constraints that hamper the ability of less developed regions

to benefit from collaboration, including weaknesses in R&D infrastructure, skills, and innovation ecosystems.

Finally, the paper has a number of limitations which warrant additional research on the topic. Its focus is restricted to AI, which leaves open the question as to whether innovation networks produce the same impacts across other strategic technologies. Similarly, the paper focuses on interregional collaboration financed through the Framework Programme, which, despite representing a sound proxy, may not provide a comprehensive picture. In this sense, the results of the paper would certainly need to be further validated by means of employing other metrics to probe networking activities, for instance, via co-patenting or patenting citations. Finally, the paper investigates only one of the two main dimensions of strategic autonomy, the other being the productive capacity of the EU.