Strengthening innovation in Greece - opportunities and challenges

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Innovation is undoubtedly a primary and vital priority in our era, not only for businesses but for states as well, which compete in this field reckoning its importance so for a country's long-term economic growth and social prosperity as for the enhancement of their political influence at a global level.

Similarly, the EU has set quite high expectations in this area, aspiring to be at the forefront of global research and innovation, as notably stated in the Budapest Declaration on the New European Competitiveness Deal, signed on November 8, 2024, by the leaders of the European Union during the informal summit. However, it is evident that there is a significant gap that the EU must bridge compared to its trading partners in order for the current lag to be reduced.

The data presented in the report by the seasoned politician and former President of the ECB, Mario Draghi, on the future of European competitiveness (2024) are particularly revealing regarding the EU's current position in innovation compared to its competitors. EU businesses spent in 2021 approximately half the percentage of GDP compared to its US counterparts, a difference of around €270 billion; a significant gap attributed to the surging investment rates in the US technological sector compared to the EU. In patent filings, where universities and other research institutions play a pivotal role, only 17% come from the EU, compared to 21% for the US and 25% for China. Indicatively, based on the volume of publications in top academic scientific journals, the EU has only 3 universities and research institutions ranked among the top 50 globally, while the US has 21 and China has 15. As far as the innovation clusters is concerned, which are critical hubs for a dynamic industrial structure, as observed in the US, the EU has none in the global top 10, while the US has 4 and China has 3.

Regarding public spending on research and innovation, the EU has the Horizon Europe program with a budget of around €100 billion. However, this amount is distributed across numerous research fields, and its access is highly bureaucratic, without focusing adequately on disruptive innovation. The share of global venture capital funds raised in the EU is only 5%, compared to 52% in the US and 40% in China, reflecting the lower levels of demand within the EU. Between 2008 and 2021, out of 147 "unicorns" valued at over €1 billion founded within the EU, 40 relocated their headquarters abroad, primarily to the US. The EU's primary tool for supporting radically new technologies at low readiness levels, the Pathfinder instrument of the European Innovation Council (EIC), has a budget of only €256 million for 2024, compared to 4.1billion for the US Defense Advanced Research Projects Agency(DARPA) and 4.1billion for the US Defense Advanced

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Research Projects Agency (DARPA) and 2 billion for other "ARPA" agencies. In the pharmaceutical sector, which gained significant attention in recent years due to COVID-19, the average approval time for a new drug by EU regulatory authorities in 2022 was 430 days, compared to 334 days in the US.

The EU's performance in research and innovation should not come as a surprise, considering the broader environment in which businesses, universities, and research institutions operate within the EU. Beyond any issues of insufficient funding for research and development, which unquestionably constitute a significant challenge to fostering innovation within the EU, as highlighted by both Mario Draghi in his report on the future of EU competitiveness (2024) and Enrico Letta in "Much More Than a Market" (2024), there are several other barriers that hinder innovation and entrepreneurship in general. The EU has created an impressive volume of legislative and regulatory work in recent years, which now imposes a particularly burdensome regime, especially for startups, limiting their growth in various ways within the single market and raising questions about the actual freedom the single market provides in this area.

The complex and costly processes in fragmented national systems discourage inventors from securing intellectual property rights that would allow them to leverage the single market. The EU's "labyrinthine" regulatory environment for tech companies hampers innovation, with over 100 laws and more than 270 regulatory authorities operating in digital networks across all member states, many of which adopt a precautionary approach, such as the Artificial Intelligence Act, which imposes additional regulatory requirements on general-purpose AI models exceeding a predefined computational power threshold - a threshold already outdated technologically. Digital companies, facing heterogeneous requirements across EU member states and different regulatory authorities, are essentially discouraged from operating across the EU through subsidiaries.

Data, and specifically the restrictions within the EU on its storage and processing, create high compliance costs and hinder the creation of large, integrated datasets for training AI models, putting EU companies at a disadvantage compared to the US and China. Similarly, due to the fragmentation of the single market in cloud providers, only larger companies, typically headquartered outside the EU, have the financial capacity and incentive to bear the compliance costs applicable in each EU member state, while new innovative tech companies may choose not to operate within the EU.

The need for fortification of the financial resources available to the EU for this purpose, as well as improving the regulatory framework, are not the only obstacles to innovation. The EU's significant dependence on critical resources such as rare earth elements, magnesium, chemical products, solar panels, cybersecurity, cloud and edge IT software inter alia poses a threat both to the prospect of fostering innovation within the EU and to achieving the goal of the twin transition (green and digital). The extent of the EU's reliance on third countries in these areas is the subject of the second in-depth analysis of Europe's strategic dependencies, presented by the European Commission on February 3, 2022. Specifically, the EU depends on China for 93% of its rare earth imports and 89% of its magnesium production, with these needs expected to double by 2030. It relies on

strategic chemical substances such as iodine, fluorine, red phosphorus, lithium oxide, lithium hydroxide, molybdenum dioxide, and tungsten from Eurasian countries (e.g., Kazakhstan, Russia, China), which are significant exporters of these chemicals to the EU.

Although the European Green Deal requires a tenfold increase by 2050, EU solar panel manufacturers account for only 1% of global production, with China holding 96%. While the EU holds a leading position in global cybersecurity research, only 14% of the world's top 500 cybersecurity companies are headquartered in the EU, with most of the hardware and software used within the EU for cyber defense developed in the US and manufactured in China. Finally, while the European cloud computing market tripled between 2017 and 2020, reaching €5.9 billion, the market share of EU cloud service providers fell from 26% in 2017 to 16% in 2020.

As a matter of fact, it is clear that the EU needs to take bold steps and make radical changes to eliminate a series of barriers that currently hinder innovation. This must be done immediately to prevent the EU from losing further ground to its trading partners. Similarly, member states have a significant role and responsibility to effectively develop the means and tools provided by the EU to leverage the opportunities available to them.

Within this context, this paper aims to explore the current state of innovation in Greece, identify key areas for improvement and highlight successful international practices that could be adopted to strengthen the Greek innovation ecosystem.

Current Innovation Landscape in Greece

Greece's innovation landscape has undergone significant transformation over the past decade, marked by a growing startup ecosystem, increased public and private investment in research and development (R&D), and the emergence of various innovation-driven initiatives. Despite this progress, the country still faces several challenges in fully leveraging its potential as an innovation hub. These include regulatory constraints, fragmented, support mechanisms, and a need for a stronger entrepreneurial culture.

Greece has made notable strides in fostering innovation, particularly through national and European programs, the establishment of incubators and accelerators and the support of university-based research initiatives. Multiple organizations such as Hellenic Development Bank, Financial Institutions, European Investment Bank, VCs etc., have introduced financial instruments to support startups and small – medium sized enterprises (SMEs). Additionally, initiatives such as Equifund and Elevate Greece have provided a structured framework to encourage entrepreneurship and investment in high growth sectors.

However, several barriers continue to impede the rapid scaling of innovative enterprises. Bureaucratic inefficiencies, limited access to venture capital and gaps in the commercialization of research outputs are among the main challenges. While the country ranks relatively well in human capital and research, it lags behind in business innovation, digitalization, and international competitiveness.

Key Areas for improvement

To overcome these barriers and unlock Greece's innovation potential, a multi-faceted approach is required:

1. Enhancing collaboration between academia and industry.

   Greek universities and research centers produce high-quality scientific output, but there is a gap in transferring this knowledge into commercial applications.

Strengthening university - industry partnership through Technology Transfer Offices, (TTOs) and collaborative R&D projects can bridge this gap. Best practices from countries like Germany, where the Fraunhofer institutes have successfully linked academia with industry, could serve as a model for Greece.

2. Developing a robust Venture capital Ecosystem

Access to finding remains a major bottleneck for Greek startups. While early-stage funding has improved, growth-stage investment is still scarce. Encouraging more participation from private investors, business, angels and corporate venture arms can provide the necessary capital for scaling. The UK's Enterprise Investment Scheme (EIS), which offers tax incentives to angel investors, is an example of a policy that could be replicated in Greece.

3. Improving the regulatory environment for startups

Greece needs a more startup-friendly regulatory framework to reduce administrative burdens and foster a dynamic business environment. Simplifying company registration processes, offering tax incentives for R&D investment and providing fast-track procedures for innovative businesses, can enhance competitiveness. Estonian's e-Governance model which allows businesses to register and operate digitally is an example Greece could explore.

4. Building an entrepreneurial culture

Promoting a mindset that embraces risk-taking, creativity and resilience is crucial for sustainable innovation. Introducing entrepreneurship education in schools and universities, along with mentorship programs led by experienced entrepreneurs, can inspire the next generation of innovators. Israel's emphasis on entrepreneurship training within military and academic institutions has played a key role in its emergence as a global tech leader.Leveraging EU and international partnerships.

5. Leveraging EU and international partnerships

Greece can maximize its participation in European innovation programs, such as Horizon Europe and strengthen ties with international innovational hub. Establishing bilateral agreements with leading innovation ecosystems, like Silicon Valley or Nordic tech hubs, can create opportunities for knowledge exchange and foreign investment.

6. Supporting sector specific innovation

Greece has unique strengths in maritime, tourism, agri-food and energy sectors. Investing in targeted innovation initiatives within these industries, can yield high returns. For instance, Norway's blue economy innovation programs offer a model for sustainable maritime technology development that could be adapted.

Innovation is a key driver of economic growth, and competitiveness, and Greece has the potential to become a leading player in the European innovation landscape. By addressing structural weaknesses adopting international best practices and fostering a culture of entrepreneurship, the country can accelerate its transition towards a more innovation-driven economy. Strategic investments in human capital, infrastructure and regulatory reforms will be critical in shaping a resilient and dynamic ecosystem that can compete at a global scale.