About the Article

How can we maximize the societal benefit of increasing defence expenditure? There is a positive correlation between higher defence expenditure and overall public R&D expenditure. The EU needs to strengthen the interconnectedness of the defence and civilian sector to maximize innovative spillover effects that result from an increase in defence R&D.

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The Innovative Potential of Increased Defence Spending in the EU

The emerging geopolitical fragmentation of the world confronts Europe with mounting challenges in both the economic and security spheres. For years, Europe has depended on China as a growing market to export its products and to benefit from a globalising economy. At the same time, Europe has outsourced its defence to the United States and relied on unwavering U.S. support in case of any aggression from a foreign state. This reliance on China as an export market and the U.S. as a provider of defence has allowed Europe to significantly increase its global exports and enjoy a peace dividend through a reduction of defence spending. However, both of these pillars of the European economic and security model are falling apart. China is rapidly catching up and surpassing Europe in critical technologies, such as AI, clean energy manufacturing and batteries. At the same time, the U.S. is increasingly unwilling to support Europe militarily and has openly questioned its commitment to the mutual defence obligation of NATO. These global shifts force Europe to rethink its economic and security model at the same time. This article argues that economic competitiveness and security policy are deeply intertwined and must be considered together to allow Europe to regain economic strength and security independence. To this end, this article will first explore the existing issues of European Competitiveness and the societal challenges that come with a significant increase in dense spending. Following this overview, this article will analyse how an increase in defence spending can benefit the wider economy and the innovative capacity of Europe as a whole. To this end, this article argues that innovative spillover effects, mission-oriented innovation, and ecosystem formation must be essential aspects of a new European approach to innovation to regain international competitiveness and security independence.

The Current State of European Competitiveness and Security Policy

Europe has a productivity problem. Between the end of 2019 and the first half of 2024, productivity per working hour in the EU has only grown by 0.9%. In the same timeframe, productivity per working hour has grown 6.7% in the United States (Draghi, 2024). This persistent gap has led to a significant gap in GDP between the EU economy and the United States. In 2002, the United States had a 17% higher GDP at constant prices than the EU. By 2023, this gap had widened to 30% (Draghi, 2024). The productivity gap between the US and the EU has a variety of reasons, spanning from cultural differences to the availability of capital. However, one critical factor that has contributed to the widening of the productivity gap in recent years is the EU's lack of high-tech innovations that have caused significant GDP growth in the United States (Highfill & Surfield, 2022). Most notably, the EU lacks competitive global companies in critical sectors such as AI, microchips and cloud computing. Instead of focusing on a limited number of disruptive technologies, EU economies, such as Germany, have focused on a broad spread of incremental innovations in already developed industrial sectors. However, in a context of rising geopolitical confrontation, especially with Russia, and increasing competition from state-supported global industries in China, this economic model is facing severe difficulties. At the end of 2024, industrial production in Germany was almost 10% lower than in 2021 (DEstatis, 2024). To address these structural deficiencies in productivity and innovation, and to confront the geopolitical realities of the 21st century, the EU needs a new and ambitious approach to innovation and defence. As a response to the full-scale Russian invasion of Ukraine, many European states have pledged to significantly increase their defence spending to generate a credible conventional deterrence against future Russian aggression. For the past decades, the official guideline of NATO to spend 2% of GDP on defence was out of reach for most European countries. Now, in 2025, the perspective of raising defence spending to 3.5% of GDP is a realistic scenario that is seriously considered by European NATO states. In Germany, increasing defence spending to 3.5% of GDP would mean total spending of

around 150 billion € per year, if one were to take the German GDP of 2024 as a reference (Destatis, 2025). This level of spending will place great fiscal strain on the German state, which expects declining tax revenues for the foreseeable future (Bundesministerium der Finanzen, 2025). It is often argued that public expenses in the defence sector do not offer sufficient societal benefit compared to other public investments, such as infrastructure or welfare programs. With regards to the direct economic impact of defence spending, this argument must be considered valid to some extent (Europe Economics, 2013). After production, military weapons and equipment offer little long-term benefit to the economy, except for some maintenance activities, which are conducted by the defence industry. Nonetheless, the current geopolitical environment forces Europe to significantly increase its defence spending to adapt to the fast-evolving nature of warfare. While this concentration of state capital poses societal challenges, it also offers an opportunity to simultaneously address economic competitiveness in strategic sectors and European Security. In future conflicts, having the technological edge will be decisive to ensure credible deterrence (Cheung, 2021). The resulting increase in research and development expenditures must not only benefit the defence industry, but can serve as a driver for innovation throughout the economy.

Innovative Spillover:
The diffusion of innovation through cooperation between different industries.

Levying the potential of increased defence spending through innovative spill-overs

Innovative spillover describes a process in which research and innovation in a particular industry are transferred to use cases in another industry. Such innovative spillover effects generate secondary, often unintended, benefits from a research and development (R&D) investment (Myers & Lanahan, 2021). These innovative spillover effects are particularly relevant when considering public R&D support. Myers & Lanahan (2021) analysed the innovative spillover effects of the Small Business Innovation Program of the US Department of Energy. Their findings show that for each patent that was funded by the program, an average of three related patents were filed by independent actors, who benefited from the innovative spillover effects generated by the initial public R&D investment. These findings demonstrate the strong potential that could be leveraged in the wake of increasing R&D investment in the defence sector. In addition to the passive diffusion of innovation through spillover effects, public R&D investment also incentivises additional private sector investment into R&D. Moretti et al. (2025) have shown a strong crowding-in effect of public R&D investments through defence spending on additional private investment. This effect is observable not only in the defence sector itself but also in related civilian industries. They also found that an increase in defence R&D significantly increases the overall R&D expenditures of a state. This overall increase in public R&D supports both military and civilian innovation. Furthermore, the analysis of Moretti et al. has shown that the industries that benefit the most from an increase in defence R&D are aerospace, electronics, technical instruments, chemistry and machinery, all of which are essential to an innovative and competitive economy and play a central role in emerging strategic industries such as AI and clean energy production.Europe needs a more mission-oriented approach to innovation to address the current issues in Europe's innovation system, which is falling further and further behind the U.S. and China. In a mission-oriented approach to innovation, academia, private industry, and the state would identify certain key technologies in which accelerated innovation is essential for the competitiveness of the market and the technological sovereignty of the state (Landesmann & Stöllinger, 2020). Through an integrated, mission-oriented approach, larger financial resources and technological know-how can be coordinated to reach sufficient economies of scale to compete with heavily state-subsidised innovation in China and deep capital markets in the US. Public defence R&D can play

an important role in such a mission-oriented approach to innovation. Many of the strategic industries, such as AI or Cloud Computing, that are essential for economic competitiveness are also key to military development. The increase in public R&D, which will be a product of increased defence spending, must be used efficiently in this mission-oriented approach to benefit both the geopolitical security and economic competitiveness of the EU. To facilitate the efficient use of public and private R&D investment, the EU should focus on the creation of innovative ecosystems. Innovative ecosystems are a geographic cluster of public research institutions, universities, and private industries that create an ecosystem that is much more efficient than a dispersed approach to innovation. This efficiency is gained by facilitating the above-mentioned innovative spillover effects, as well as a concentration of talent and capital (Liu & Ma, 2023). These innovative ecosystems are also the ideal construct to follow a mission-oriented approach to innovation, because they combine the innovative strengths of public and private research institutions and companies with a defined goal that allows the concentrated use of available capital. An example of a successful innovation ecosystem, which has profited from a mission-oriented approach to innovation and strong defence-driven R&D investment, is the Silicon Valley in the United States (Juhász et al., 2024). Many of the key breakthrough innovations of the Silicon Valley, such as the internet or GPS, were enabled by the US Defense Advanced Research Projects Agency (DARPA), which is a military research institution that operates based on a mission-oriented approach to innovation. A European example that could serve as an important innovative ecosystem is the Munich area in Germany. Today, this area already combines the strengths of world-class research institutions, such as the Max Planck Institute, strong academic institutions with the Technical University of Munich and global industry players, such as Airbus Defence and BMW. In addition, several innovative defence start-ups, such as Helsing, have established themselves in the Munich area. Airbus Defence and Helsing are both very likely to significantly profit from an increase in public defence R&D. This infusion of capital into the innovative ecosystem must be leveraged to maximise the benefit from the innovative spillover effects that can be generated between these different institutions. Innovation through Defence Spending Compared to Traditional R&D Support. It could be argued that funnelling R&D investments through defence spending is an unnecessary detour, when it would be possible to directly increase the budget of public research institutions or financially incentivise

Figure 1: Map of Europe that indicates the headquarters locations of the 10 biggest defence industry companies.(Own Work)

R&D investment of the civilian industry. However, defence spending gives the state access to funds at a scale that would otherwise be difficult to justify. In times of geopolitical confrontation, the argument of national security unlocks public R&D spending that is unachievable without high defence spending. Moretti et al. (2025) found a strong correlation between the overall R&D investment of a state and its defence expenditures. A recent example of this effect is the exclusion of defence spending from the national debt brake in Germany, which theoretically allows "unlimited" spending for defence. Using this lever of national security for R&D thus allows far greater investment than traditional public R&D in the civilian sphere. A popular instrument to incentivise private R&D is government tax breaks that allow private companies to write off part of their R&D investment. This instrument is currently being used in the Inflation Reduction Act in the US, which has the objective to support private investment in strategic industries, such as semiconductors or clean energy (U.S. Congress, 2022). However, Moretti et al. (2025) have shown that public defence R&D is three times as effective in crowding in additional private investment as government tax breaks. The argument of greater available capital, as well as a stronger impact on mission-oriented innovation, supports an approach that ties defence R&D to civilian applications. To enable innovative spillover in strong ecosystems, the increase in funds available for defence must go hand in hand with a shifting mindset towards a more innovative approach in military spending. Currently, Germany only spends around 5% of its defence budget on R&D, which amounts to roughly 3.6 billion euros of defence R&D investment (ReportLinker, n.d.). The United States, in comparison, spends almost three times the amount (15%) (U.S. Department of Defense, 2024). If Germany increased its overall defence budget to 3.5%, meaning around 150 billion euros per year, and simultaneously raised its share of defence-related R&D to the same level as the United States, roughly 22,5 billion euros would be available for defence-related research activities. Moretti et al. (2025) estimate that if Germany were to increase its defence R&D to the level of the United States as a fraction of GDP, private R&D investment would increase by 72% in defence-related industries. While such an increase is unrealistic at the moment, it shows the strong effect that defence-related R&D can have on associated private R&D investments.

The EU is already taking steps to facilitate cooperation among member states in defence R&D. Important initiatives include the EU Defence Innovation Scheme or the European Defence Innovation Hub (EUDIS, 2025; HEDI, 2025). These initiatives mainly focus on pooling innovative resources from different member states to increase the overall efficiency of the EU innovation ecosystem. In addition, programs such as Horizon Europe already follow a mission-oriented approach to innovation. While Horizon Europe is currently focused exclusively on civilian research, the EU Commission has recently highlighted the need to consider the inclusion of dual-use applications into the Horizon framework (European Commission, 2023). The EU has also recognised the need for a mission-oriented approach to innovation. In 2021, the Commission called for a "capability driven" approach to innovation to improve the synergies between the civilian and the defence sector (European Economic and Social Committee, 2021). These various initiatives show that Brussels has understood the need to improve EU performance in defence R&D and to facilitate stronger links between the civilian and defence sectors. However, in the past, these initiatives lacked high-level political backing and the necessary funding to develop a meaningful impact. In the context of current geopolitical developments and significant increases in funding, these existing initiatives need to be implemented and expanded to develop their full potential.

Europe needs a more mission-oriented approach to innovation.

EU defence and R&D expenditure

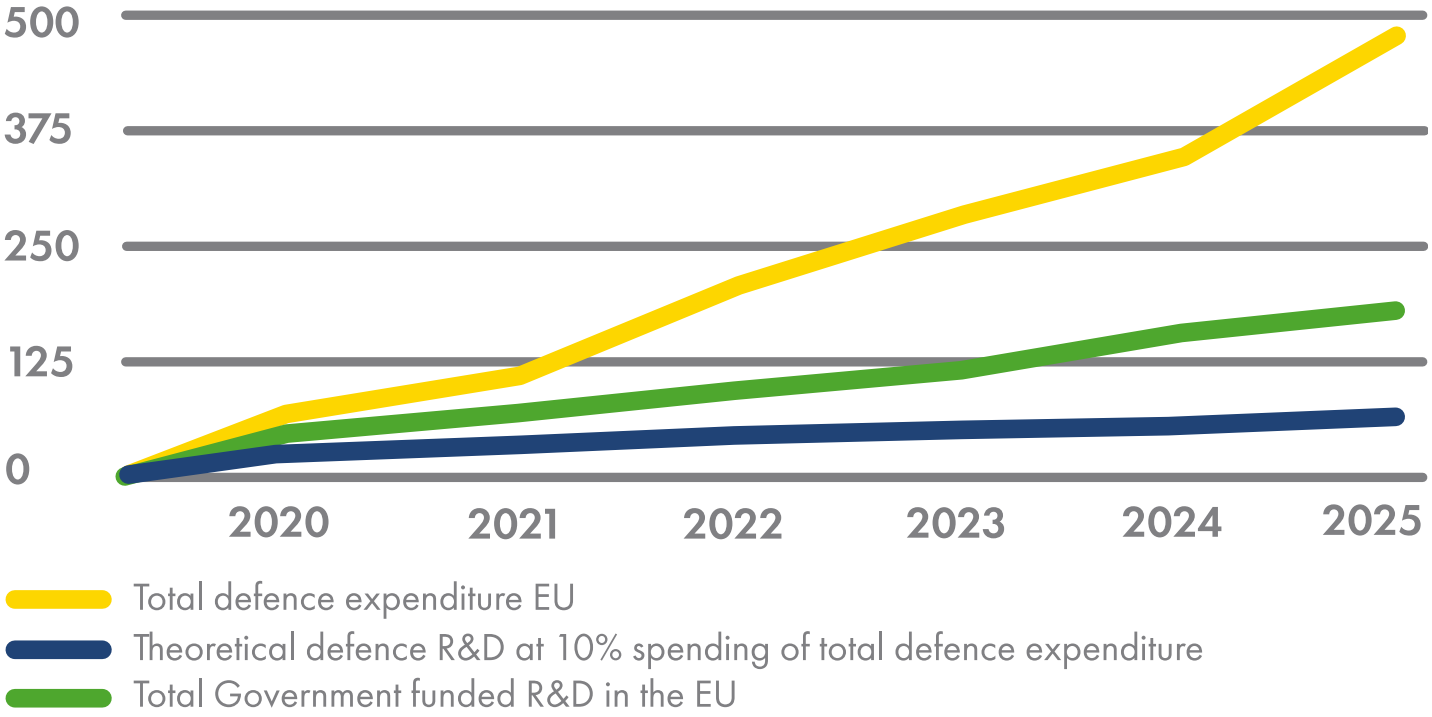

Figure 2: Total government budget for R&D in teh EU (2024 and 2025 projections based on past developments) (Sources: https://ec.europa.eu/eurostat/databrowser/view/GBA_NABSFIN07__custom_16931918/default/table?lang=en https://www.consilium.europa.eu/en/policies/defence-numbers/)

4. Conclusion

An increased use of defence spending for R&D will only be one step of a broader effort that is needed to support Europe's innovative potential. Deeper capital markets, stronger universities of excellence and larger companies are all necessary to catch up with the likes of China and the US. Defence is, and always has been, an all-of-society endeavour. The best army can not offer credible deterrence if it is not supported by a strong industrial base and an innovative economy. Now, at a time when Europe faces intense geopolitical pressure, it is necessary to make sure that the increase in defence spending not only supports the military but also the broader innovative capacity of the EU to strengthen the societal effort of building a strong and resilient European Union.

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