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What policies for a secure and competitive Europe?

10 ideas for the European Commission

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Introduction

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The European Union faces extraordinary conflux of challenges: geopolitical tensions, armed conflicts, geoeconomic realignments, and the lingering effects of the COVID-19 pandemic and energy crisis. These immediate challenges are further compounded by transformative macrotrends: the technological revolution, energy transition, and demographic shifts.

This volatile environment presents a formidable task for the incoming European Commission. The gravity of these challenges and potential solutions have been examined in several high-level reports commissioned throughout 2024. The analyses presented by Enrico Letta on the Single Market, Mario Draghi on economic competitiveness, and Sauli Niinistö on security collectively underscore that maintaining the status quo poses significant risks to the EU's future trajectory.

While the structure and Mission Letters of the new Commission demonstrate readiness to embrace an ambitious economic agenda, historical precedents—such as the implementation challenges of the Lisbon Strategy—serve as a reminder of the complexity in translating strategic diagnoses into effective policies.

A fundamental consideration is the EU's composition of national economies with diverse capabilities and growth trajectories. While the aggregate diagnoses presented in the Draghi and Letta reports are sound at the EU level, they may not fully reflect the specific challenges faced by individual member states. The imperative to enhance productivity, accelerate energy transition without deindustrialization, and boost innovation must be balanced against the risk of exacerbating economic divergence between regions and countries.

At the same time, remarkable history of European integration demonstrates that – to paraphrase Aristotle - European Union is not a mere heap of member states, but – as a whole - is something besides the parts. The Single Market exemplifies this principle, having transformed the EU into a global trade powerhouse while facilitating the economic convergence of Central and Eastern European economies post-2004.

This collection of policy notes presents recommendations for the incoming European Commission, synthesizing common European challenges with solutions that incorporate the Central and Eastern European perspective.

We start with defence sector. With the brutal war at its eastern border and rise of other military conflicts EU should aim for a substantial increase in the budget allocated to defence priorities and foster synergies with national expenditures to boost defence spending as a percentage of GDP. At the same time, these investments should help strengthen local industries. This is why, among other things, there is a pressing need to establish funds and support programs specifically tailored for dual-use innovations.

When speaking about EU security, we shouldn’t forget that it’s also being decided next to our borders – in Ukraine. Apart from continuous military and macroeconomic support, Ukraine should have a clear prospect for its accession to the European Union.

Current challenges create tensions between industrial policy targets and competition policy aims. We discuss some of these in the chapter devoted to telecommunications. It ends with the message that industrial policy actions in the telecommunications sector should aim to create new sources of revenue for traditional telecom operators while ensuring that the situation for consumers does not worsen.

In two chapters related to energy transition we point out the capabilities and challenges specific to CEE countries, focusing on areas of district heating and nuclear power. The main message here is that EU should provide equal and fair support to all low-carbon technologies. Funding mechanisms should be flexible and enable countries to prioritize their preferred technologies, based on comparative advantages. By adopting a technology-neutral approach and creating electricity market structure that enables the harmonious coexistence of different energy generation sources, EU increases chances for faster and successful energy transition.

Chapter devoted to trade concludes that diversification of trade relations must remain a top priority for the European Union to reduce dependence on specific goods or raw materials. We also underline that the EU urgently needs a new approach to tariffs which would reflect new approach to evolving global trade landscape and support EU's industrial policy.

Last but not least we suggest that EU should aim for extending its budget on a permanent basis. However difficult it would be, The European Commission needs to adapt bold strategy to break the 1% GNI budgetary ceiling. The 20% of the €800 billion investment needed for the twin transition, as reiterated by Draghi, amounts to about €160 billion—roughly an additional 1% of Member States' GNI.

Mario Draghi urged the EU to implement a number of reforms to avoid "slow agony" – and this report adds concrete recommendations that shed new light on some of the issues. It is now the task of policymakers to transform these ideas to policy actions in order to boost the EU's ability to maintain its position as a leading global economic power while ensuring prosperity for its citizens in an increasingly complex and competitive world.

Defence

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State of affairs

European defence capabilities should be considered in a transatlantic context, as NATO has been the primary organisation for European military security for the past 75 years. Disputes about the fair burden-sharing between the US and Europe have been inherent to NATO since the beginning of the alliance. They also took place during the Cold War, when the largest European allies allocated much more resources to defence than today.

Following the adverse changes in the regional security environment over recent years, there has been a significant increase in both national defence spending and European defence investments under the EU flag. The EU's Common Security and Defence Policy (CSDP) and the bloc's support for the defence industry – through the development toolbox were two of the vehicles used to bolster European security – useful in aiding Ukraine and member states' defence capabilities. However, the current funding levels and mechanisms are still insufficient to handle the challenges arising from the Russian threat and global rivalries.

NATO context

Since the late 1990s, most European NATO members have initiated the process of adapting their armed forces to the seemingly lasting changes in the international order. This period, known as the peace dividend phase following the collapse of the USSR, was marked by a reassessment of collective defence strategies and a search for new roles for national armed forces. For many years, the primary focus shifted towards out-of-area engagements, such as in Afghanistan, leading to a transformation in military capabilities. **This shift favoured the development of leaner, lighter expeditionary units designed for rapid deployment to distant theaters, typically against non-peer adversaries**. Concurrently, there was a widespread reduction in defence spending, a move away from conscription, and a drive towards professionalizing the armed forces. These changes were accompanied by a reduction in trained reserves, as well as a contraction of military infrastructure and defence industries (Bergmann et al., 2022).

The year 2014 marked a pivotal moment for European defence. The NATO mission in Afghanistan, which had dominated the military efforts and focus of European allies for over a decade, concluded. Simultaneously, Russia initiated its ongoing aggression against Ukraine and annexed Crimea, serving as a crucial wake-up call for many countries. **In response, European military strategies began reverting to traditional focuses on territorial defence and deterrence**. Notably, Eastern flank states, especially Poland and the Baltic states bordering Russia, increased their defence spending and troop numbers. This trend intensified across Europe, propelled by increased pressure from the US for more equitable burden-sharing in maintaining Euro-Atlantic security during President Trump's administration. The urgency further escalated following Russia's full-scale invasion of Ukraine in February 2022.

The EU context

The 2019-2024 institutional cycle witnessed significant changes in EU defence and armaments policy, influenced by three pivotal events: Brexit, the presidency of Donald Trump, and Russia's full-scale invasion of Ukraine (Fiott, 2023; Gotkowska, 2019). **For the first time, the EU allocated substantial funding for joint ventures in the defence industry's research and development phase, establishing the European Defence Fund (EDF) with a budget of €8 billion for 2021-2027**. Since 2021, under the Directorate General for Defence Industry and Space (DG DEFIS) led by the Internal Market Commissioner, the EU has launched several initiatives, including the Act in Support of Ammunition Production (ASAP), the European Defence Industry Reinforcement through Common Procurement Act (EDIRPA), and the European Defence Industry Programme (EDIP) to bolster the EU's Defence Technological and Industrial Base (EDTIB) (Maślanka, 2024). Although their total funding does not exceed €2 billion and might not seem groundbreaking, the comprehensive support for armaments production, from R&D to disposal, marks a significant policy shift. Additionally, in 2024, EU member states agreed that increased defence spending would be considered a mitigating factor in the excessive deficit procedure. The European Investment Bank is also set to play a more active role in financing dual-use investments, complemented by EU budget financing for projects enhancing military mobility, totalling €1.5 billion.

In the Common Security and Defence Policy (CSDP), which operates independently of the EU budget and is coordinated by the High Representative for Foreign and Security Policy (HR/VP), there has been ongoing debate about the most effective methods for funding overseas missions/operations and military assistance to partners. This debate culminated in the establishment of the 2021 European Peace Facility (EPF), an extra-budgetary instrument funded directly by member states. **Following the events of 24 February 2022, the EPF emerged as a pivotal mechanism for refinancing member states' military aid to Ukraine, including arms supplies, and for funding the EUMAM Ukraine training mission**— the largest EU-led initiative to date (EEAS, 2024; Karjalainen, Mustasilta, 2023). The EPF's role in aiding Ukraine prompted a substantial increase in its funding cap, from the initial €5 billion to €17 billion for the 2021-2027 period.

Starting with the current institutional cycle (2024-2029), the Directorate-General for Defence Industry and Space (DG DEFIS) falls under the jurisdiction of the newly appointed Defence Commissioner, Andrius Kubilius (EPP). Although the Commissioner for Defence reports to the Vice-President for Technological Sovereignty, Security, and Democracy, Henna Virkkunen (EPP), his role in fostering a 'European Defence Union' involves close collaboration with the HR/VP, Kaja Kallas (Renew). This partnership could potentially lead to a gradual integration of these two central pillars of EU defence policy, without necessitating treaty amendments.

Challenges

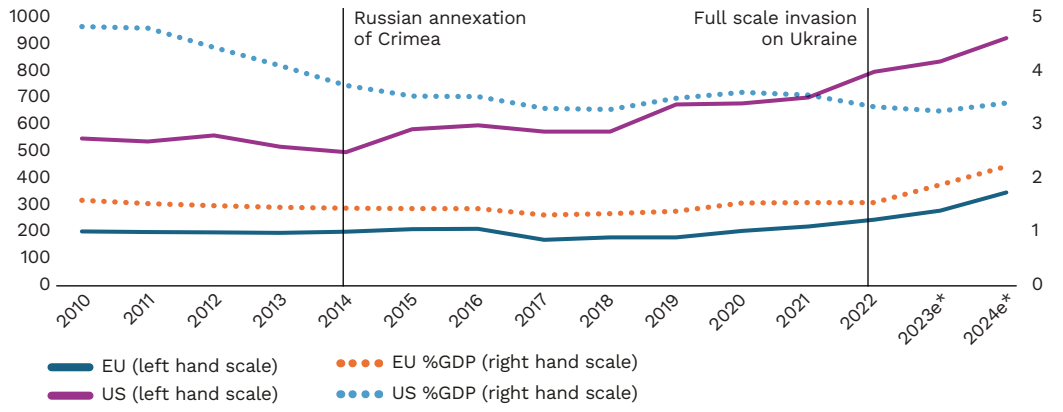
A fundamental challenge in financing the EU's defence industry policy and the Common Security and Defence Policy (CSDP) stems from **the reluctance of some member states to increase their contributions to the EU budget and the CSDP funding**. These states are concerned that higher expenditures could edge the EU towards a transfer union—a prospect they are keen to avoid (Bloomberg, 2024). Consequently, the notion of significantly boosting defence funding in the upcoming Multiannual Financial Framework (MFF), let alone incurring joint debt for such purposes, remains highly contentious despite institutional support from the EU.

Resistance also persists against the ongoing utilization of the European Peace Facility (EPF) to refinance military aid to Ukraine. Hungary has notably obstructed the disbursement of additional funding tranches, utilizing the EPF as a tool of political leverage against other member states and Ukraine itself. Moreover, some member states, particularly major contributors like Germany, prefer to support Kyiv through bilateral relationships rather than EU channels, viewing the EPF as a means to indirectly subsidize the budgets of other EU states (Politico, 2024; Maślanka, 2024). Conversely, capitals such as Paris advocate transforming the EPF into a mechanism that further supports the European arms industry (Pugnet, 2024). This shift could potentially compromise the efficacy of the EPF, as donor decisions might then prioritize the nationality of arms suppliers over the urgency of aid delivery, thereby diminishing the EPF's role as a crisis-response tool.

The effective management of the European Peace Facility (EPF), particularly in terms of channelling and distributing additional funds, hinges on achieving consensus among EU member states. However, blockades by certain states, notably Hungary, have fuelled arguments among proponents of institutional EU reforms, advocating for a shift away from unanimity in decisions related to foreign and security policy. These disruptions underscore **the need for more streamlined decision-making processes to enhance the EU's agility in responding to international crises**.

A persistent challenge within the European Union is the European Commission's **reluctance to demand that member states increase their national defence spending**. Historically, such requirements have been included under the CSDP-coordinated Permanent Structured Cooperation (PESCO) framework but have not been rigorously enforced; instead, the real impetus to boost defence budgets has predominantly stemmed from the tangible threat posed by Russia. The 2024 European Defence Industrial Strategy (EDIS) introduced non-binding criteria for the share of joint or EU-manufactured military procurements and provided only general incentives for escalating defence expenditure. Yet, the advocated enhancement and acceleration of arms production in the EU necessitate a robust demand stimulus, unachievable with the current levels of European defence spending. From 1999 to 2021, EU countries increased their defence spending by a mere 20%, starkly contrasted by the US at 66%, Russia at 292%, and China at 592% (European Commission, 2022).

Figure 1. Defence spending in the EU and the US (bn EUR, per cent of GDP)



* data for the EU for 2023 and 2024 are estimated based on NATO data for 23 NATO members from the EU.

Source: PEI's own calculations based on NATO data and European Defence Agency Data. Data for 2023 and 2024 are estimates ('e').

Although the Russian invasion of Ukraine triggered a notable rise in EU military expenditures—from €240 billion in 2022 to an estimated €350 billion in 2024, as reported by EC President Ursula von der Leyen (European Parliament, 2024)—this increase remains uneven across member states and lacks a guarantee of long-term sustainability.

Despite a notable reduction in the defence spending gap between the US and its European and Canadian NATO allies (whose aggregate spending increased from USD 250 billion in 2014 to USD 430 billion in 2024), the difference still amounts to USD 325 billion in 2024 (NATO, 2024). This figure indicates that the US continues to outspend all other alliance members combined by approximately 75%. A marked increase in expenditure by European allies and Canada was observed particularly in 2023-24, with annual increases of 9.3% and 17.9%, respectively. However, for European NATO member states, this growth was partially due to the accession of new members, namely Finland and Sweden. Preliminary 2024 data submitted to NATO by member countries reveal that eight of the 32 allies (nine including Iceland, which lacks armed forces) still fail to meet the baseline guideline of allocating 2% of GDP to defence needs. Among the largest European allies falling short of this target are Italy, Spain, and Belgium (Pszczel, Szymanski, 2024). On a positive note, since 2022 there has been a significant surge in modernization spending, with equipment expenditures for European allies and Canada growing by 16.4% and 36.9% year-on-year in 2023-24, respectively.

A critical issue within the EU's defence funding framework is **that the primary beneficiaries are companies from countries with well-established defence industries or those with robust ties to major European arms manufacturers**.[1] Without implementing a more equitable distribution method, increased funding may further entrench market dominance, disproportionately benefiting Western European military companies over their Central European counterparts. This concern mirrors the caution advised in proposals for consolidating the European defence industry, as supported by certain member states (notably France) and recently endorsed in the Draghi report (2024). National armament agencies already struggle to negotiate reasonable prices with manufacturers. If unchecked, support for the monopolistic tendencies of large producers, alongside the promotion of the "Buy European" principle, could lead to a scenario where these oligopolies dictate prices. Moreover, the EU's ambitious drive for standardization of armaments and military equipment risks potential conflicts with NATO standards and operational compatibility.

Recommendations

1. **A strategic compromise on the financing of the EU's arms policy in the forthcoming Multiannual Financial Framework (MFF) should prioritize two main objectives**. Firstly, **it should aim for a substantial increase in the budget allocated to defence** priorities. Secondly, **it should foster synergies with national expenditures to boost defence spending** as a percentage of GDP. Achieving these goals may necessitate exploring alternative funding sources beyond the existing ones, such as direct member state contributions or EU bonds (see also the chapter on the next MFF). Potential options could include the utilization of frozen Russian assets or the reallocation of unspent EU funds designated for programs like the Next Generation EU.
2. **Provide incentives for countries actively engaged in building common defence**. The upcoming negotiations on the European Defence Industry Programme (EDIP) present an opportunity

[1] According to the available data up to 2022, the main beneficiaries of the European Defence Fund programs are companies from France, Italy, Germany, and Spain. Together with the Benelux and Nordic countries, they account for about 80% of the funding. European Defence Fund, Open Security Data Europe, www.opensecuritydata.eu. See also: Value for Money? Denmark's Participation in the European Defence Fund (EDF), Terma, May 2024, www.terma.com.

to shape the future of EU defence industry policy. The project builds on the framework established by previous initiatives, but member states should be encouraged to propose their own solutions, potentially setting precedents for future policies. **Specifically, the EDIP could incentivize member states to dedicate at least 2% of their GDP to defence by offering increased reimbursement rates, from the standard 35% to 45%, for companies based in such countries**. Additionally, it would be beneficial to **ease the application requirements in critical defence capability areas**, such as munitions, by reducing the minimum number of necessary applicants. Addressing the need for geographically balanced capacity development within the EU's defence industry is also worth considering. One strategy could involve integrating Ukraine into EDIP projects, which is anticipated to boost funding levels. Similar incentives could extend to companies from countries nearest to Russia that allocate at least 2% of their GDP to defence, ensuring a more robust and regionally diverse defence industrial base.

3. To foster the development of the European Defence Technological and Industrial Base (EDTIB), **the European arms industry should maintain a high degree of openness towards cooperation with non-EU industries from allied and partner countries**. Embracing innovation, and the exchange of experience and technology is essential for advancing this sector. Overly protectionist measures that isolate European companies could ultimately be detrimental to the EDTIB. Moreover, **it is crucial to establish a clear and consensual division of labour between the EU and NATO**, particularly in areas sensitive to security such as the standardization of military equipment and production priorities. This clarity will help avoid duplications and inefficiencies, ensuring a more coherent and effective defence posture.

4. **The EU should prioritize supporting the development of military capabilities in areas where there are significant shortfalls and dependence on US enablers**. These include defence industrial capacity (notably munitions production), long-range strikes, suppression of enemy air defences, air-to-air refuelling, strategic airlift, satellite communications, reconnaissance and intelligence, and underwater warfare. Additionally, given the critical importance of logistics and rapid troop movements, it is imperative to substantially increase investments and cooperation in military mobility. To this end, securing additional EU funding and creating synergies with the NATO Security Investment Programme (NSIP), which co-funds projects for military infrastructure enhancement (including airports, telecommunications, command and control systems, fuel and lubricant depots, fuel pipelines, radar warning and navigation equipment and port installations), is essential.

5. **A reform of the Permanent Structured Cooperation (PESCO) to concentrate on fewer, more visionary programs, coupled with robust financial incentives under the EDIP and future initiatives, will further enhance this strategy**. The European Defence Project of Common Interests (EDPCI) mechanism within the EDIP serves as an ideal framework for focusing funds on the most necessary projects. Additionally, allowing EDPCI consortia the ability to issue their own bonds—backed by participating member states or the EU budget—could attract significant private financing, further bolstering EU defence capabilities.

6. **The High Representative and the European External Action Service (EEAS) should defend the accomplishments of the European Peace Facility (EPF) as a crucial instrument for providing rapid emergency assistance to EU partners**. To mitigate the constraints imposed by the unanimity principle, member states should consider innovative governance reforms. One approach could involve establishing a separate ad hoc fund that could continue such aid to Kyiv without hindrances. Furthermore, it is essential to preserve the EPF's flexibility, ensuring it remains a mechanism for aiding partner countries rather than becoming a tool of European industrial policy.

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Dual-Use Technologies

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State of affairs

Defined as technologies applicable to both civilian and military purposes, dual-use technologies are increasingly vital in today's global economy and defence systems. They encompass a broad spectrum of innovations, including advanced materials, space technologies, artificial intelligence (AI), biotechnology, communication systems, and cybersecurity. For instance, space technologies initially developed for military purposes have seen widespread civilian use in navigation and global communications. Similarly, the development of AI systems, predominantly driven by private companies and academia, finds applications in both autonomous military systems and civilian industries like data analysis and process automation.

Innovative approaches by technology companies are crucial for developing new solutions that address the distinct needs of both civilian and military markets. While dual-use technologies share characteristics with other tech categories, such as deeptech, they also present unique challenges. The convergence of civilian and military applications in these technologies not only creates opportunities for synergistic advancements but also introduces complex challenges related to their development, deployment, and regulation. These include regulatory issues, security concerns, and financial constraints, which are particularly critical due to their potential for both military and civilian applications.

Advancing the development of dual-use technologies should be a strategic priority for the European Union and NATO member states. The overarching objective is to nurture a robust ecosystem that promotes the rapid development, adaptation, and commercialization of innovative technological solutions, while simultaneously safeguarding national security.

A significant indicator of the growing focus on dual-use technologies is the establishment of the NATO Innovation Fund (NIF) in June 2022, following Russia's full scale invasion of Ukraine. This initiative, a central component of the NATO 2030 agenda, is supported by a budget of one billion euros. The NIF aims to foster the development of cutting-edge technologies with potential defence applications, such as artificial intelligence, big data processing, quantum technologies, biotechnology, new materials, energy systems, propulsion technologies, and space exploration. Additionally, earlier this year the European Investment Bank (EIB) announced a substantial investment of six billion euros designed to accelerate the development of dual-use technologies in sectors including security, defence, space exploration, and cybersecurity.

Challenges

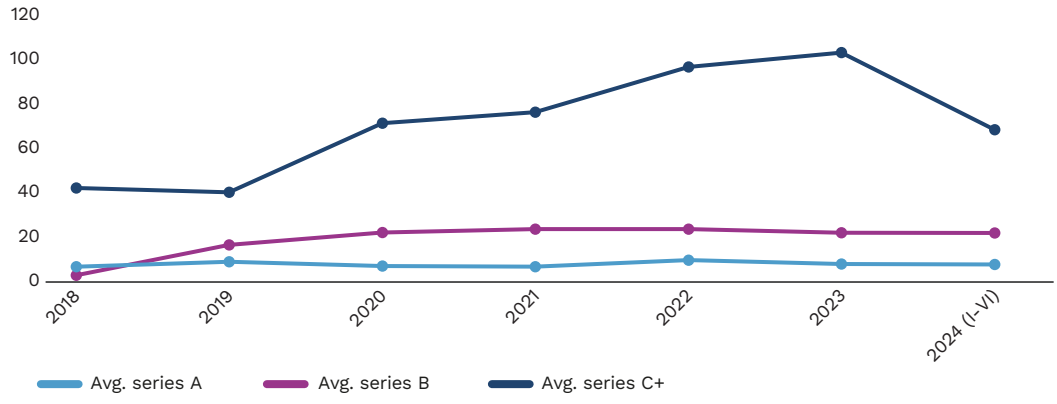
Establishing effective collaboration and synergies between the civilian and military sectors presents a notable challenge. The civilian sector is marked by rapid innovation and flexibility, contrasting sharply with the military's need for stringent certification and lengthy approval processes. This disparity can

lead to delays in the adoption of new technologies and increases the risk that innovations may not be fully utilized within military applications.

A promising model for bridging these sectors is the European Institute of Innovation and Technology (EIT), particularly its EIT Digital branch. EIT Digital fosters cooperation among academia, industry, and research institutions across Europe, accelerating innovation in digital technologies. It supports entrepreneurship and start-ups, provides access to a pan-European resource ecosystem, and facilitates cross-border collaboration, all of which could serve as an inspiration for similar initiatives in the dual-use technology arena.

Despite increasing investor interest, **dual-use technologies often struggle to secure sufficient financing, especially in the crucial early stages of development**. Start-ups and nascent technology companies frequently face liquidity constraints during the "valley of death"—the critical phase between research and development (R&D) and commercialization. This period involves extensive validation, certification, and public procurement processes, which can span months or even years before yielding positive results. Additionally, these companies must navigate differing demands from the private and public sectors, necessitating a high degree of flexibility and adaptability. Without adequate financial backing, innovation may falter, preventing promising technologies from reaching the market.

Figure 2. Average VC funding by stage for European defence tech startups (million USD)



Source: PEI's own calculations based on sifted.eu data.

In addressing these financial hurdles, **the NATO Innovation Fund (NIF) with its €1 billion budget and a new €6 billion initiative by the European Investment Bank (EIB) are notable**.

The development of dual-use technologies necessitates stringent regulations to ensure security and control over the transfer of these technologies to potential adversaries. The complex landscape of international regulations, varying standards, and diverse export requirements can pose substantial barriers for companies engaged in developing dual-use technologies. These regulatory challenges require careful navigation to prevent unauthorized access and misuse while promoting innovation and commercial viability.

Amid escalating global threats, **the rapid and effective implementation of new technologies is crucial**. However, complex certification and approval procedures can significantly decelerate the process

of bringing innovations to market. This delay may hinder the ability to respond swiftly to rapidly evolving challenges, potentially weakening strategic responses and operational readiness.

Managing projects aimed at developing dual-use technologies **presents significantly more complexity compared to projects with purely civilian or military objectives**. It necessitates a deep understanding of the specific needs of both sectors and the ability to adeptly navigate a multifaceted regulatory and contractual environment. This dual focus requires project managers to possess a unique set of skills and knowledge to successfully balance these often divergent requirements.

To **evaluate the success of initiatives in this policy area, several key indicators should be considered**. One crucial metric is the growth in the number of start-ups and technology companies specializing in dual-use technologies, along with their expanding share in the global technology market. A larger and more dynamic dual-use sector will not only diversify sources of innovation but also significantly bolster the competitiveness of the European economy.

Another pivotal challenge is accelerating the transition from research and development to market implementation. Success in this area can be gauged by a reduction in the average time required for the certification and market entry of dual-use technologies.

Moreover, strengthening partnerships among the private sector, academia, and military organizations is essential for the advancement of dual-use technologies. **An increase in the number of partnerships, consortia, and joint R&D initiatives will indicate more effective integration of diverse resources and expertise**. Additionally, a rise in investment from both public and private sectors will be a crucial indicator of success, as evidenced by the growth of projects funded by venture capital and an increase in dual-use initiatives supported by public funding programs.

Finally, in the context of global technological competition, it is vital for European dual-use technology firms to maintain a competitive edge. Success in this regard could be measured by an increase in their market share, as well as a rise in the number of patents and innovative solutions developed by European companies.

Recommendations

1. **Creating Dedicated Funds and Support Programs: There is a pressing need to establish funds and support programs specifically tailored for dual-use innovations**. These programs should address the unique needs of the defence sector and market requirements, offering support at various stages of technology development, from early R&D to market entry. Such funds could provide grants, loans, or equity investments to promising dual-use projects, especially during their pivotal early stages.

   The European Commission, leveraging its existing programs like Horizon Europe and the European Defence Fund, is ideally positioned to lead the development of these financial instruments. By adapting these frameworks to specifically support dual-use technologies, the Commission can ensure that innovators working on projects with both civilian and military applications receive customized financial backing. Furthermore, these programs should account for the unique regulatory and compliance challenges that dual-use projects encounter, offering streamlined application processes and reduced administrative burdens to improve access to funding.

   A dedicated dual-use technology fund could also promote public-private partnerships, encouraging private investors and venture capital funds to co-invest in early-stage innovations alongside public funding. This approach would not only augment the financial resources available

but also establish a more robust support system for the commercialization of dual-use technologies, ensuring that European companies remain competitive in global markets.

2. **Strengthening International and interinstitutional Cooperation:** Enhancing international collaboration, particularly within NATO and the European Union, as well as cooperation between stakeholders from the government, academia and the private sector is crucial for facilitating knowledge exchange, sharing best practices, and jointly financing R&D projects. **Establishing networks of innovation hubs across Europe that connect startups, research institutions, and military organizations** can accelerate the deployment of dual-use technologies.

   One benchmark could be a structure similar to EIT Digital, but focused on dual-use technologies which could be instrumental in linking defence-related startups with key military organizations, venture capital firms, and research institutions throughout Europe. Such collaborative efforts can also standardize regulations and lower barriers to cross-border technology transfer.

   Another successful model for cooperation between various stakeholders is exemplified by the European Digital Innovation Hubs (EDIH), which support businesses and public institutions in their digital transformation by providing access to technology testing, funding, and networking opportunities.

   Adapting the EDIH model to create Dual-Use Innovation Hubs would enable startups, academic researchers, and defence organizations to collaborate on joint R&D projects, align technological developments with market demands, and streamline the commercialization process. Additionally, this platform could serve as a matchmaking service for stakeholders from various sectors, ensuring that the right expertise and resources are strategically aligned to address particular challenges in dual-use innovation. **Such a platform would also bridge the gap between civilian and defence markets**, ensuring that technologies developed for one can be seamlessly adapted for use in the other.

3. **In a similar vein, supporting the development of specialized incubators and accelerators focused on dual-use technologies** can equip startups with the necessary resources, mentorship, and networking opportunities to thrive. Such an initiative can bridge the gap between innovative ideas and market-ready products by providing access to funding, technical expertise, and potential customers in both civilian and defence sectors.

   Initiatives like the European Space Agency's Business Incubation Centre (ESA BIC) could serve as a model for a dual-use innovation network. ESA BIC has successfully reduced barriers for space-tech startups by offering comprehensive technical and business support, as well as fostering collaboration between industries and academia.

4. **Simplifying Regulatory Procedures and Creating Accelerated Certification Pathways:** It is crucial to simplify regulatory procedures and create accelerated certification pathways to hasten the market introduction of new solutions. Governments should aim to harmonize regulations across countries to minimize bureaucratic delays and ensure that innovative technologies can be deployed quickly and safely.

   This effort could be integrated into existing frameworks such as the Important Projects of Common European Interest (IPCEI), which facilitates streamlined collaboration on significant technology and innovation projects. IPCEI provides a legal framework that supports large-scale cross-border projects where public support is necessary to overcome market failures. By leveraging the IPCEI structure, dual-use technologies could benefit from coordinated, pan-European regulatory alignment, facilitating faster development, certification processes, and simplifying the complexities of exporting across borders.

Additionally, **expanding the Single Market Programme or adapting elements of the European Innovation Council (EIC)**, which focuses on breakthrough innovations, **to specifically streamline regulations for dual-use technologies would be beneficial**. This adaptation would promote a unified approach to certification and regulatory requirements across Europe, making it easier for companies to navigate the approval process and expedite the commercialization of their products.

5. **The abovementioned efforts could be further supported by establishing Fast-Track Certification Pathways**. These could potentially be modelled on existing successful programs such as the fast-track approval process under the Medical Device Regulation. Such a streamlined system could significantly reduce the time required to transition dual-use technologies from the research stage to commercial readiness. Implementing such pathways would enable Europe to maintain its competitive edge and respond more effectively to emerging global security threats.
6. **Raising Awareness and Providing Education on Dual-Use Technologies:** Increasing awareness and offering educational opportunities about dual-use technologies among investors, policymakers, and potential end-users is crucial for generating greater interest and support for this sector. Initiatives such as conferences, workshops, and training programs are vital in helping stakeholders understand the unique challenges and opportunities associated with dual-use technologies. These educational efforts can facilitate informed decision-making and foster a supportive ecosystem for the advancement of dual-use technological innovations.

Telecommunications Market

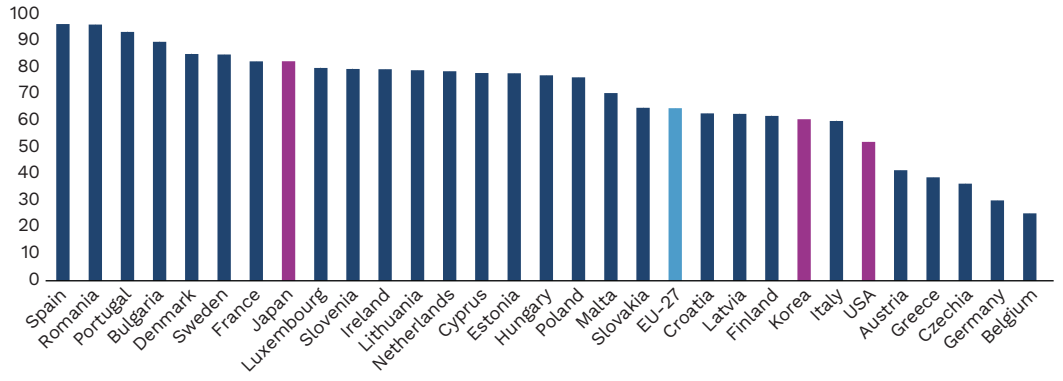
Ignacy Święcicki (Polish Economic Institute)

State of affairs

The European telecommunications market is poised for substantial changes, as underscored by three strategic documents recently presented in the EU: the European Commission's White Paper on digital infrastructure (European Commission, 2024), Enrico Letta's Report on the Single Market (Letta, 2024), and Mario Draghi's Report on European competitiveness (Draghi, 2024). These documents collectively emphasize the need for sector consolidation, aiming to scale up European telecom operations, harmonize regulations, and shift some competencies from national to EU level. However, the devil lies in the details—both in the solutions proposed and, crucially, in the initial diagnosis and the selection of objectives that these measures intend to achieve.

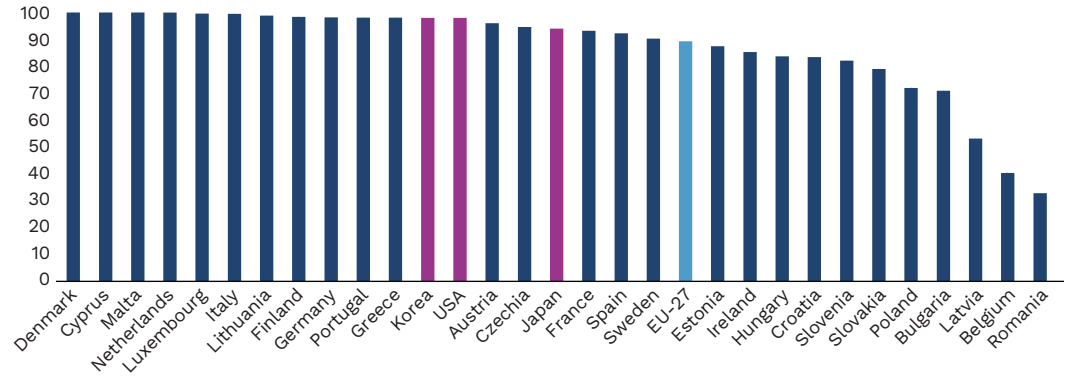
First, it is crucial to acknowledge that **the European telecommunications market is characterized by slow revenue growth and relatively lower investment levels compared to markets such as the United States**. These indicators are well-recognized and uncontroversial. However, assessments of network performance can vary. On one hand, at the community level, Europe trails behind the U.S. and China in metrics such as total 5G network coverage. On the other hand, **Europe holds a competitive advantage with lower service prices and has made significant strides in areas like fibre optic network coverage and industrial 5G applications**.

Figure 3. Fibre networks coverage rate (FTTH/FTTB) in EU member states, USA, Japan and South Korea in 2023 (households passed / total households)



Source: PEI's own calculations based on Eurostat, ETNO (2024), Fiberbroadband.org.

Figure 4. 5G coverage rate in the EU member states, USA, Japan and South Korea in 2023



Source: PEI's own calculations based on Eurostat, ETNO (2024), ITU.

Europe's digital network development is anything but monolithic; at the national level, it emerges as a global leader in network quality and infrastructure, especially in 5G and Fibre to the Home (FTTH) technologies (refer to charts 1 and 2 below). For instance, Denmark boasts 100 percent household coverage by 5G networks, while countries like Spain and Romania achieve around 95 percent coverage with fibre optics. Therefore, **the overall situation is more nuanced** than it might initially seem, marked by significant variability between countries, even within a unified regulatory framework. Europe's performance is not uniformly negative but rather presents a complex landscape that underscores both strengths and challenges.

The decline in investment in the telecommunications sector is concerning, especially considering that the value of investment per user in Europe is lower compared to other global regions. However, this reduction in spending could also be interpreted as a natural phase in the investment cycle. Operators have already committed substantial capital to acquiring radio spectrum and constructing 5G networks. Currently, their focus has shifted towards generating returns from these significant investments.

Operators are currently facing a dual challenge. On one hand, **the surge in network traffic necessitates continued investment** to expand and upgrade infrastructure. On the other hand, **the ambitious goals set by the European Union**, such as achieving full 5G coverage and ensuring 100% of households have access to Fibre to the Building (FTTB) by 2030, **require significant additional funding**. Meeting these targets is estimated to cost nearly EUR 200 billion (European Commission, 2024). However, other estimates, such as those from Stratix (2023), suggest that the actual figure might be lower.

The Draghi and Letta reports advocate for market consolidation as a key strategy to boost investment in the European telecommunications sector. By increasing the scale of operations, telecom operators could enhance their capacity to invest more substantial amounts. This, in turn, is expected to drive the development of the broader digital economy in Europe. The authors frequently cite the U.S. and Chinese markets as examples, where operators benefit from larger customer bases and higher revenues, supporting the case for consolidation.

However, **it is crucial to acknowledge that European operators already have significant global reach**. For instance, Telefonica Hispam operates across several South American countries, and T-Mobile US, a subsidiary of Deutsche Telekom, is a leading provider in the U.S. While matching the user scale of Chinese or Indian companies may be unrealistic for European operators, even without the proposed

consolidation, European telecom firms still hold a substantial role in global competition. **Their presence on other continents underscores that European operators can remain competitive on the world stage, despite structural differences in market size and regulatory environments**.

Challenges

While the European telecoms market holds lower value compared to, say, the US, and the amount of investment required to achieve the Digital Decade's goals significantly exceeds the operators' current capabilities, the real challenges appear to be rooted elsewhere.

First and foremost, telecom operators have lost their role as leaders of technological change to technology companies, platforms, and equipment manufacturers, almost all of which are based in the United States. According to JRC data (Nindl et al., 2024), the largest telecom companies worldwide (29 in total) spent a combined total of EUR 18 billion on R&D in 2022. In comparison, Google invested EUR 37 billion, Meta EUR 31 billion, Microsoft EUR 25.4 billion, and Apple EUR 24.6 billion in the same year. There are no European digital companies of that scale, or even close.

Europe is perceived as lacking innovation and falling behind in technological advancements. However, the issue extends beyond the telecoms industry, suggesting that sector consolidation alone will not address the underlying problem. European telecom companies have struggled to develop new revenue streams. They have neither established a European cloud infrastructure, making them dependent on hyperscalers—as pointedly noted by Draghi—nor have they successfully monetized 5G networks. The market for private networks, particularly those used in industry, remains nascent. According to ETNO data (2024), only 6% of telecom companies' revenues derive from activities other than communications or pay-TV.

In this context, **the development of industrial 5G networks is particularly significant**. Accelerating such solutions not only has the potential to strengthen the position of telecoms but also offers an opportunity for the advancement of European industry, enhancing competitiveness, and serving as a launchpad for the development of platforms operating on industrial (non-personal) data. This sector is not yet dominated and presents substantial opportunities for economic value.

The scale of investment required to achieve the goals of the Digital Decade, estimated at EUR 200 billion, is indeed substantial. However, given current industry trends, **one must question whether such a massive expenditure will effectively allocate resources to enhance productivity and competitiveness in Europe**. 5G networks offer substantial value in specific applications, such as networks in factories, densely populated areas, transportation corridors, or smart farming. Yet, the current goal, which stipulates coverage in "populated areas" defined as areas where households are located, may not yield substantial additional profit for operators or significant social benefits beyond what a developed LTE network provides. Furthermore, the deployment of fibre-optic cable to all premises incurs enormous costs for capabilities that many users may not fully utilize (Webb 2024). Therefore, there is a pressing need to revisit these objectives to ensure they align more closely with the actual capabilities of the telecommunications sector.

Regulatory changes in the market are indeed necessary, and shall be addressed by the upcoming revision of the European Electronic Communications Code. The three documents mentioned earlier propose changes that move in a similar direction—transferring more competences to the EU level—yet they differ in specifics. **The challenge here lies in aligning the instruments with the revised diagnoses and securing approval from the Member States. The objectives of these changes must also be clear: they aim to deepen the single market by eliminating differences between national laws**

(e.g., security regulations), **level the playing field** between messaging and telecom services, and **make obligations more realistic** (addressing issues of symmetric/asymmetric access, etc.).

One of the **key challenges of the regulatory layer of the European telecoms market is the ongoing debate over the full harmonization of radio spectrum allocation rules**. While such a measure might not be welcomed by national governments, its potential benefits for the sector are also debatable. Harmonization alone is unlikely to enhance coverage in unprofitable or peripheral regions, where defining clear coverage obligations could be significantly more effective. Moreover, this approach might primarily benefit the largest telecom operators, potentially disadvantaging smaller players and consumers.

Another practical challenge involves proposals to **redirect funds from frequency auction proceeds or frequency rights fees toward investments**—whether through mandatory investment obligations, declarations, or other mechanisms, as exemplified by Sweden in the 800 MHz band auction. This redirection of funds could yield substantial long-term benefits by ensuring that revenues from spectrum sales are reinvested into infrastructure development.

Finally, the urgent challenge is the **need to harmonize regulations, particularly in areas such as cybersecurity and consumer protection**, and to establish parity between telecom operators and instant messaging services. While implementing these changes would help level the playing field, it may be too late to fully reclaim users who have already transitioned to instant messaging platforms. Nevertheless, addressing these regulatory disparities is essential to ensure fair competition in the future.

Recommendations

1. **Industrial Policy Actions in Telecommunications:** Industrial policy actions in the telecommunications sector should aim to create new sources of revenue for traditional telecom operators while ensuring that the situation for consumers does not worsen. One effective strategy could be to **support the development of industrial or campus 5G networks** through demonstration activities, building awareness, promotional support, and grants. It's important to note that today's breakthrough innovations are increasingly emerging outside the traditional telecoms sector, where Europe significantly lags behind other regions. Thus, our focus should shift towards these areas to seek innovative solutions.

2. **Guided Regulatory Review:** The regulatory review should be directed by clear objectives: **to deepen the single market through regulatory harmonization and level the playing field by ensuring that all service providers, including traditional telecoms and over-the-top (OTT) players, are treated equally**. These changes must consider ongoing technological advancements and market dynamics, particularly in areas like regulated access and universal service obligations (Feasey et al., 2024).

   The focus should not be solely on expanding the scale of operators' businesses but on the efficiency of solutions and their targeted application. For instance, **extending operators' rights to use radio spectrum** enhances their capacity and seems to be an acceptable solution for national governments. Furthermore, **redirecting funds from spectrum fees away from national budgets and towards infrastructure investments** could offer substantial long-term benefits, despite potential resistance from countries facing rising fiscal deficits. Over time, this strategy could not only yield positive fiscal impacts but also contribute to the sustainable development of the telecommunications sector.

3. **Review of the Digital Decade goals:** The upcoming review of the Digital Decade goals, planned for 2026, presents an opportunity to revise them, especially concerning fibre and 5G network coverage. While ensuring connectivity for all citizens (both fixed and mobile) is crucial, adopting a more technology-neutral approach could be beneficial. Effective connectivity can also be achieved using other technologies, such as Fixed Wireless Access (FWA) or 4G LTE. **Regarding 5G coverage, the focus should be on providing networks to areas where 5G can deliver significant value**—such as industrial zones, transportation corridors, possibly large farms, and densely populated areas. However, the latter are often commercially viable, so they should not receive direct public support. Additionally, more effort should be directed toward ensuring high-quality indoor coverage.

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District Heating

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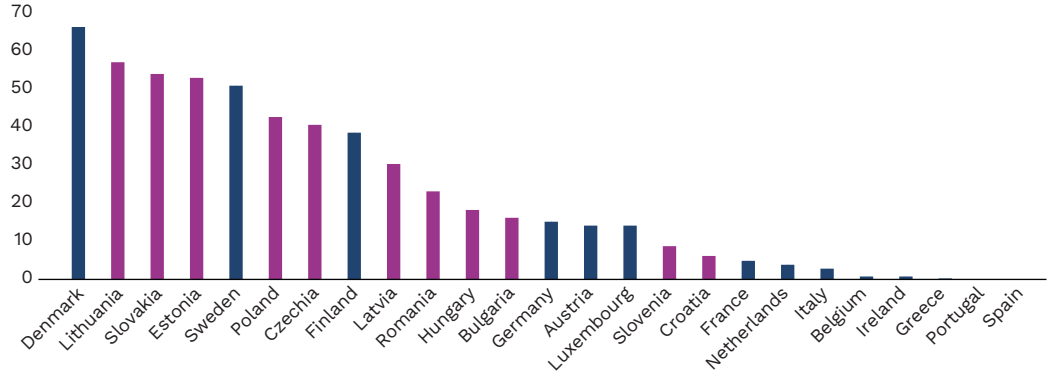
State of affairs

Heating constitutes the largest energy end-use. In 2022, households accounted for 28% of the EU's final energy consumption (Eurostat, 2024a), with 79% of that energy being used for space and water heating (Eurostat, 2024b). Therefore, decarbonizing the heating sector is a crucial component of the energy transition. Like other aspects of this transition, the decarbonization of heating hinges on two main strategies: firstly, enhancing energy efficiency; and secondly, substituting fossil fuels with low-emission technologies. In Central and Eastern European (CEE) Member States, the dependency on fossil fuels for heat production is especially significant, with 63% of gross heat production in 2022 derived from fossil sources, compared to the EU average of 53% (Eurostat, n.d.). Moreover, the reliance on fossil fuels in heat production varies widely across the CEE region, ranging from as low as 17% in Lithuania to 93% in Romania.

Figure 5. Share of households connected to district heating in EU countries (CEE countries marked in purple)

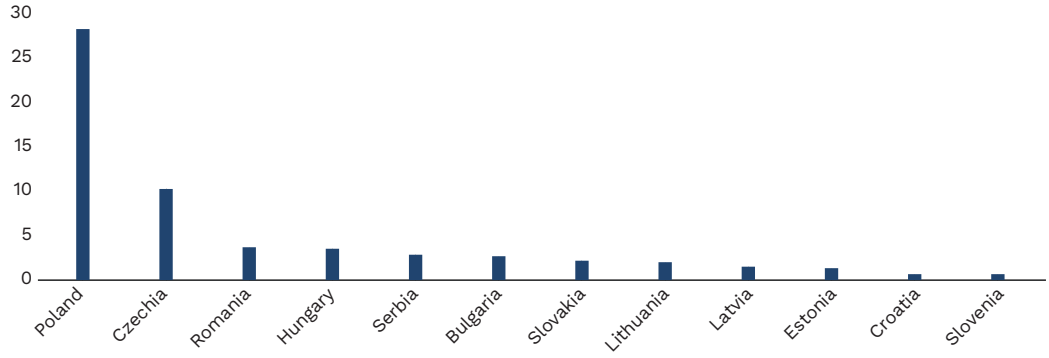


Source: PEI's own calculations based on WEDISTRICT data.

District heating represents a significant method for supplying heat to households across the EU. However, **the market penetration of district heating systems varies widely between Member States—from virtually 0% in Portugal and Spain to 65% in Denmark**. Central and Eastern Europe, in particular, show a strong reliance on these systems. **For example, in Poland, approximately 42% of the population (around 15 million people) is connected to district heating systems, while in Lithuania, Slovakia, and**

Estonia, the share exceeds 50% (www1). Notably, Poland boasts one of the most extensive district heating networks in Europe, with Warsaw hosting the continent's largest infrastructure of this kind.

Figure 6. CO_2 emissions in combined heat and power (CHP) plants in Central and Eastern European countries in 2022 (in mln tons of CO_2)



Source: PEI's own calculations based on Eurostat data.

Challenges

District heating systems have the potential to achieve high levels of energy efficiency and integrate renewable energy sources; however, modernization entails significant costs. For instance, in Poland, most of the district heating infrastructure is aging—over 80% of combined heat and power (CHP) units have been operational for more than 30 years (Izba Gospodarcza Ciepłownictwo Polskie, 2023). Upgrading this aging infrastructure is crucial to meeting EU emission standards. **Unlike individual heating systems, households connected to district heating networks cannot independently decarbonize**. Consequently, the path to decarbonizing the heating sector will vary significantly depending on the prevalence of district heating within a country—or the absence thereof. Without adequate policy support and funding mechanisms, the cost of decarbonizing district heating systems could be prohibitively expensive, especially in CEE countries with older systems. Nevertheless, district heating offers economies of scale benefits, where a single investment could reduce emissions across thousands of households.

District heating's broader social impact extends beyond decarbonization; it also helps mitigate the potential increase in energy poverty, an indirect consequence of the energy transition. According to a study by the Polish Economic Institute (Lipiński, Juszczak, 2023), **access to a district heating network halved the risk of falling into communal energy poverty and significantly reduced the proportion of energy spending in household incomes during the 2022-2023 energy crisis. Moreover, access to hot water through district heating decreased the likelihood of using low-quality fuels by 13 times, while access to district heating itself reduced this likelihood by 11 times**. The same study found that 68% of surveyed households were concerned about their energy bills during the 2021-2023 energy crisis.

Decarbonization of the heating sector can be a significant strategy for protecting households from the price volatility of fossil fuels, as observed following the COVID-19 crisis and the Russian invasion of Ukraine. **Crucially, there is currently a lack of uniform indicators for energy poverty within the EU, which hampers a more operational understanding of Article 2(52) of Directive 2023/1791**. Standardizing the measurement of energy poverty across EU Member States would likely make a positive contribution to alleviating it.

Similar to the electricity sector, system-wide decarbonization of heating requires a reevaluation of the fundamental principles that currently guide the system. This necessity arises largely due to the non-dispatchable nature of renewable energy sources such as solar and wind, which require flexibility measures. While natural gas offers a consistent and reliable heat supply, it remains a fossil fuel with highly volatile prices. Although it is less emissive than coal or oil, its environmental impact is still considerable. Nuclear power, especially through small modular reactors (SMR), presents a promising zero-emission alternative for district heating solutions in the future (Sokka et al., 2024). Biomass also serves as an alternative to fossil fuels and is particularly suited for rural areas where resources like agricultural residues are abundant. However, in recent years, it has been recognized as an emission-intensive and increasingly import-dependent energy source.

District heating has the potential to enhance balance in the energy system by generating heat during periods of overproduction from weather-dependent sources, and conversely, by providing electricity during times of insufficient supply. Electrode boilers, an increasingly popular technology in heating, are particularly well-suited for offering demand-side flexibility. When there is an excess of renewable electricity, these boilers can efficiently absorb the surplus and convert it into heat. This heat can then either be stored or directly utilized within district heating networks (Gicevskis, Linkevics, 2023).

The recently commissioned renewable heat plant in Lidzbark Warmiński, Poland, exemplifies how low-emission installations require the integration of several complementary technologies. The Lidzbark plant primarily utilizes heat pumps equipped with built-in storage systems to maximize the use of electricity generated from weather-dependent renewable sources. Additionally, the system is powered by an on-site photovoltaic farm and solar thermal collectors (www2).

Another important aspect of district heating is strengthening cross-border cooperation, which enhances system flexibility. A notable example is the Görlitz/Zgorzelec district heating system, which includes a cross-border pipeline connecting two networks to jointly supply the city with heat (www3). Denmark, recognized for having one of the greenest district heating systems globally, derives 76.9% of its heat from renewable sources. Additionally, district heating serves as the primary heat source in Denmark, utilized by 65% of the population (Euroheat & Power, 2024).

Lastly, it is essential to clearly define the roles of local governments and enterprises in the decarbonization of the heating sector, given that district heating operates primarily at the local level. **The European Union can play a crucial role in aiding CEE countries in their efforts to decarbonize their heating sectors by ensuring access to targeted funding and fostering cooperation across national and local governance levels**. By establishing well-defined priorities and action plans, CEE countries can position themselves to significantly benefit from the Social Climate Fund (SCF), from which they receive a substantial share. The modernization of existing — often depreciated — infrastructure requires large upfront investments but is vital for reducing emissions from the heating sector. Given their reliance on heating due to colder climates, CEE countries, along with Nordic and Baltic states, stand to benefit particularly from EU assistance in the modernization and decarbonization of district heating through additional funding mechanisms.

Recommendations

1. **Funding for Decarbonization of the Heating Sector:** Decarbonizing the heating sector, especially district heating, necessitates substantial upfront investments. It is imperative that **new funding opportunities be established to support this transition, as heating companies alone cannot manage the financial burden without external financing**. Moreover, the significant positive externalities and broader social benefits of decarbonizing the heating sector—such as the development of clean energy and the reduction of energy poverty—should not be overlooked. One viable funding option could involve incentivizing Member States to allocate a portion of their Emissions Trading System (ETS) revenues toward heating sector decarbonization. Additionally, the EU's Cohesion Fund could serve as an alternative or complementary source of financing. **Further, any financial incentives for low-emission technologies must align with the EU's "Energy Efficiency First" principle, ensuring that technologies are primarily deployed in sectors where they are most effective**. It is essential to build on Member States' specific strengths, thus funding mechanisms should be flexible and enable countries to prioritize their preferred technologies, based on comparative advantages. For instance, countries with significant agricultural and waste resources may have greater potential for biomethane production, while those with abundant renewable energy sources are better suited for large-scale heat pump deployment.

2. **Facilitation of Sector Coupling Between Electricity and Heating: the EU should promote further developments in the heat pump market, as well as electrification incentives to diminish reliance on fossil fuels**. High priority must also be given to finalizing the EU's Heat Pump Action Plan, which has experienced delays. Furthermore, policies should increasingly incentivize smart grid infrastructure and energy storage solutions to efficiently balance renewable energy supply and demand.

3. **Promoting Cross-Border Cooperation in District Heating:** Cross-border cooperation in district heating can optimize resource sharing and enhance energy security. **This cooperation should be promoted at the central level and included in specific programs and funding mechanisms**, such as the Connecting Europe Facility or Interreg programs. By linking district heating networks between countries, Member States can more efficiently balance supply and demand, reduce costs, and better integrate renewable energy sources.

4. **Strengthening Administrative Support for National Regulatory Authorities:** To ensure effective implementation—rather than mere transposition—of legislation, **the EU should introduce administrative support systems for designated national regulatory authorities**. While the EU has made substantial legislative progress in setting the trajectory for decarbonizing its heating sectors—such as through the RED III Directive, the EPBD Directive, and ETS 2—national regulatory authorities may struggle with the increased administrative burden. The EU should therefore focus on enhancing its support mechanisms to aid in the implementation of these legislative measures.

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Nuclear Energy

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State of affairs

The energy crisis triggered by Russia's invasion of Ukraine has demonstrated that full reliance on natural gas as a transition fuel is neither the most balanced nor reliable pathway to achieving climate neutrality. At the same time, we are behind schedule in meeting both the Paris Agreement goals and the European Union's targets for 2030. An analysis of the current state of the EU-27 decarbonization process and National Energy and Climate Plans shows that the European Union will most likely fall 4% short of achieving the 55% CO_2 emission reduction target by 2030 (www1). In 2023, 17 GW of wind power was installed in the European Union; however, **at least 37 GW per year must be installed to meet renewable energy goals for 2030** (European Commission, 2023; www2). This scepticism is echoed by a panel of experts from EU countries in a recent PEI study, where only 44% believed that the 42.5% renewables target for 2030 is achievable (Pilszyk, Lipiński, Miniszewski, 2024).

While renewable energy sources continue to play a crucial role in the energy transition, they will not be sufficient to achieve sustainability targets on their own. According to the International Energy Agency, "nuclear power can play a major role in enabling secure transitions to low-emissions energy systems" (IEA, 2022). **The IPCC's 1.5°C scenario projects an average of 1,160 GW of operational nuclear energy by 2050, more than a threefold increase compared to the 375 GW installed in 2024** (IEA, 2018; www3, IAEA PRIS database). Despite the urgent need for accelerated nuclear energy deployment, many countries have recently decided to phase out nuclear power, with severe negative consequences for both the economy and the climate. **In 2021, these actions—mostly by the US, Germany, and Japan—resulted in up to 280 Mt of additional CO_2 emissions, comparable to 85% of Poland's total CO_2 emissions** (Mujica, Wang, 2022; www4).

In 2023, nuclear power accounted for 23% of electricity generation in the EU-27 (Ember, 2024). Currently, there are 100 nuclear reactors operating in 12 EU countries, with a total installed capacity of 96 GW (www5). Only two new reactors, in Slovakia and France, are currently under construction. Additionally, due to underinvestment in EU enrichment infrastructure, the EU remains dependent on third countries for enriched uranium imports. In 2023, the EU doubled its nuclear fuel imports from Russia (www6). Half of the world's enrichment capacity is owned by Rosatom, which poses risks to the security and continuity of the global nuclear fuel supply chain.

In recent years, however, many European countries have begun considering the construction of new nuclear capacity. **More than 40 new nuclear reactors in EU countries are either in pre-build preparation or have been officially announced—excluding Small Modular Reactors (SMRs)**. This number is likely to grow, as an increasing number of EU Member States are reopening the national debate on the future use of nuclear energy.

Challenges

There is no pragmatic reason to treat nuclear energy differently from other non-emission or low-emission energy sources. Nuclear power has one of the lowest full life cycle CO_2-equivalent emissions, comparable to wind energy, and the lowest life cycle eutrophying emissions of phosphorus equivalent. **It is also competitive with renewables in terms of relative land use and the intensity of materials used per MWh produced** (UNECE, 2021). Most importantly, **nuclear energy remains the only readily available fossil-free technology capable of producing consistent base-load dispatchable power**, ensuring both security of supply and enabling the broader integration of more intermittent sources into the energy mix.

Despite these advantages, the European Union remains reluctant to fully embrace the principle of technology neutrality between fossil-free assets. **Nuclear energy is not considered in most European funds that support the deployment of renewables (see Table 1)**. Compared to the hundreds of billions available for renewables from sources like the European Regional Development Fund, Horizon Europe, or the Modernization Fund, nuclear support schemes are significantly underfunded. **For instance, the Euratom Research and Training Programme for 2021–2025 had a budget of only €1.38 billion, of which nearly €300 million was allocated for nuclear fission research** (www7). While Euratom can provide loans for nuclear projects, its total budget is limited to €4 billion, which is inadequate when compared to the needs of the European nuclear industry (www8).

Table 1. Availability of European Funds for nuclear energy projects

EU Fund	Accessibility for the nuclear energy projects
Innovation Fund 38 bn EUR (2020-30)	Nuclear not listed
Modernisation Fund 57 bn EUR (2021-30)	Nuclear not listed, potentially could have access to 20% of funds as a not prioritized investment
Horizon Europe 95,5 bn EUR (2021-27)	Nuclear not openly excluded but sector is not included in invitations for fund applications
Cohesion Fund 36,6 bn EUR (2021-27)	Building and decommissioning of nuclear infrastructure excluded
European Regional Development Fund 313 bn EUR (2021-27)	Building and decommissioning of nuclear infrastructure excluded
Just Transition Fund 19 bn EUR (2021-27)	Building and decommissioning of nuclear infrastructure excluded - same as InvestEU
Recovery&Resilience Facility 338 bn EUR (2021-27)	Nuclear not specifically excluded but not supported as renewables
Connecting Europe Facility - Energy 5,8 bn EUR (2021-27)	Nuclear not listed
LIFE 5,4 bn EUR (2021-27)	Nuclear not listed among target sectors

Source: Department of nuclear energy, Ministry of Industry, 2024.

Recommendations

1. **First of all, the principle of technology neutrality should be fully recognized by EU institutions when providing support for fossil-free energy assets**. Nuclear energy projects should have the same rights to access European funds as renewable energy projects. As stated in the main objectives of the Draghi report (European Commission, 2024), "to accelerate decarbonization, all available technologies and solutions (e.g., renewables, nuclear, hydrogen, batteries, demand response, infrastructure roll-out, energy efficiency, and CCUS technologies) must be leveraged by adopting a technology-neutral approach and by developing an overall cost-efficient system." **The report further recommends not only maintaining the current nuclear supply but also accelerating the development of 'new nuclear,' including building a domestic supply chain**.

2. **Another key priority at the EU level should be the creation of an electricity market structure that enables the harmonious coexistence of different energy generation sources, including cooperation between renewable energy sources (RES) and nuclear power plants**. The current market structure is primarily focused on a system based on RES. Renewable energy sources not only benefit from various subsidies but also receive preferential treatment through price mechanisms and tax breaks, which nuclear energy does not have access to.

3. **"Renewable energy targets" should be replaced with "low-emission energy targets" or "fossil-free energy targets."** Prioritizing renewable deployment while disregarding the value of existing and planned fossil-free nuclear capacity is inconsistent with Article 194(2) of the Treaty on the Functioning of the European Union (www9). It is also highly impractical in the context of the 2050 climate neutrality target. For example, France, which generates only 25% of its electricity from renewable sources, has an emission intensity of 74 gCO_2eq/kWh (in 2022), almost four times lower than the EU average of 258 gCO_2eq/kWh.

4. **A designated, long-term, and expanded technology-neutral EU budget guarantee mechanism should be implemented to mobilize private investment in nuclear energy projects** and reduce the cost of capital for such investments. Additionally, **existing partnerships between EU Member States, private investors, and European banks should be established and strengthened to finance nuclear power, while also seeking new partners for such ventures**.

5. **The full system cost of various fossil-free technologies must be incorporated into EU strategies and documents**. While the levelized cost of electricity (LCOE) is useful for assessing the profitability of private-sector investments, it does not account for additional factors crucial to the broader national electricity system, such as grid costs and the extra capacity required to stabilize the system. The integration costs of wind and solar, particularly in large-scale deployments, can be significant and may exceed 50% of electricity generation costs.

6. **Euratom funds should be increased**, particularly the €4 billion total cap for loans. The final cost of electricity from nuclear energy is highly dependent on access to low-interest capital. Increasing the budget would help Member States finance the construction of new nuclear projects at low interest rates, thereby establishing a stable and affordable baseload energy source for the future.

7. **Finally, European Comission should encourage creating new uranium enrichment capacities within the EU.** Developing these capacities is essential to reduce dependence on imports from third countries, particularly Russia. This is especially critical for High-Assay Low-Enriched Uranium (HALEU), which is currently produced only in Russia, China, and the US (www10).

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Industrial Policy

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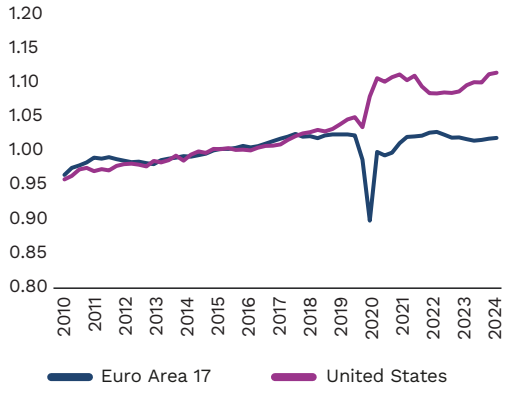
State of affairs

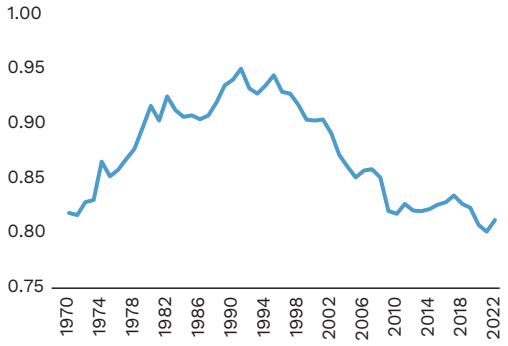
The EU faces significant productivity, investment, and technological gaps, and its competitiveness can no longer be taken for granted. The EU lags behind the US in terms of economic productivity, and various reports—from the IMF (IMF, 2024) to the Draghi report (Draghi, 2024)—highlight growing inefficiencies and a lack of new big tech companies within the EU economy. Similarly, former Italian Prime Minister Enrico Letta has emphasized the issue of "investment leakage," where private capital is increasingly invested in the US market rather than domestically (Letta, 2024).

Figure 7. Labour Productivity Index, total economy (2015=1)



Source: PEI's own calculations based on Macrobond (OECD Economic Outlook).

Figure 8. Gap in Total Factor Productivity in the Euro Area (USA=1, constant prices)

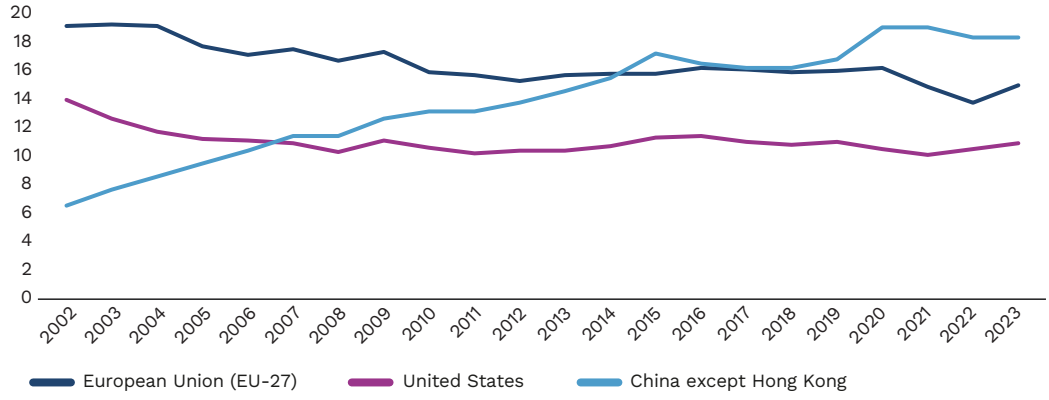


Source: PEI's own calculations based on Macrobond (Long Term Productivity database).

The EU once benefited significantly from free trade, but the peace dividend effect has come to an end. Although the EU was not the most innovative, it became a trade hegemon through its open and competitive single market. Consumers enjoyed lower prices, while businesses focused on their comparative advantages, particularly in the automotive sector and clean technologies. However, times have changed. Photovoltaic manufacturing has been almost entirely offshored to cheaper production in China, and the European automotive industry is struggling to survive the transition to post-fuel injection cars. The EU's dependency on fossil fuels, the need to replace Russian energy supplies, and its high regulatory standards have made European industries less competitive. In 2023, wholesale natural

gas prices in the US were, on average, 79% lower than in the EU, electricity prices were over 59% lower, and oil prices were 6% lower. Additionally, a lack of cohesion in EU policies has led to a disorderly transition, neglecting the provision of a strong industrial foundation.

Figure 9. Share in global exports – the EU, United States and China



Source: PEI's own calculations based on Eurostat data.

The lack of a level playing field is hindering European companies from functioning effectively and fully exploring new technological advancements or expanding into different product markets (Friesenbichler et al., 2024). Moreover, Europe is struggling to translate its innovative efforts into successful global enterprises. The seven leading tech companies in the US significantly surpass their EU counterparts, generating over ten times more revenue and boasting a market capitalization twenty times larger.

In the context of growing competition between global economic powers (e.g., the Inflation Reduction Act in the US), the EU has undertaken several actions to revive its industrial policy (Ilnicki, Lipiński, Wąsiński, 2024). In 2023, the European Commission proposed the Green Deal Industrial Plan, which includes initiatives such as the Critical Raw Materials Act, the Net Zero Industry Act, and the Global Gateway, as well as loosening state aid rules. The Commission abandoned the idea of a Sovereign Fund, a financial tool to invest directly from Brussels into EU industries. However, this idea may be revived, as European Commission President Ursula von der Leyen suggested a European Competitiveness Fund (Reuters, 2024) during her presentation of political guidelines for 2024-2029 in the European Parliament. The Mario Draghi report openly highlighted the regulatory burden of the green transition and difficult access to financing as major challenges for the EU industry. Earlier, businesses published the so-called Antwerp Declaration (2024).

Global output in EU manufacturing is heavily concentrated in several countries, namely Germany, Italy, France, Spain, Poland, and Ireland. These six countries accounted for over 70% of the total manufacturing production across the entire EU in 2022. While this highlights a significant concentration of capacity, it also spans the entirety of the EU—across both East-West and North-South divides. Therefore, any recommendations should be inclusive of all regions.

Challenges

Time is ripe, already since the beginning of XXI century. “The European Union is confronted with a quantum shift resulting from globalisation and the challenges of a new knowledge-driven economy. These changes are affecting every aspect of people's lives and require a radical transformation of the European economy. (...) The rapid and accelerating pace of change means it is urgent for the Union to act now to harness the full benefits of the opportunities presented. Hence the need for the Union to set a clear strategic goal and agree a challenging programme for building knowledge infrastructures, enhancing innovation and economic reform, and modernising social welfare and education systems”.

This is neither a quote from Letta nor the Draghi report; it is a quote from the 2000 European Council conclusions. It quite well highlights that the idea of technological development in the EU has been present for decades, but the past 25 years have failed to meet expectations, leaving many of these ideas on paper. The challenge may be a structural one. European industry faces not only unfair competition in global markets (as detailed in the trade letter) but also unequal regulatory burdens between products manufactured within the EU and those imported. Even if a level playing field is secured, labour costs in European manufacturing will still be higher compared to developing or emerging markets. This is why the EU's industry must innovate in both manufacturing processes and final products.

While the EU boasts brilliant minds and outstanding companies (e.g., in aerospace), many are relegated to supplying larger corporations—such as those in the US—that maintain direct relationships with consumers. Innovation can drive higher productivity, enabling more investment. What EU companies need is a safe haven based on long-term contracts, stable demand, and internal, fair competition. However, this is where the EU lags behind, and there is no silver bullet, especially for a Union comprising 27 Member States.

This challenge is clearly illustrated in competition policy. The loosening of state aid rules undermines the single market and risks triggering a subsidy race, not only with external competitors but also between EU Member States. While searching for solutions, it is essential not to throw the baby out with the bathwater. The key to effective industrial policy is ensuring that investment flows in the right direction, often achieved through financial support in various forms. As the EU’s capacity to act at the central level is limited, the EU has relaxed state aid rules in three stages: during the COVID-19 pandemic, the Temporary Crisis Framework (TCF), and the Temporary Crisis and Transition Framework (TCTF) in response to the energy crisis and the Russian invasion of Ukraine.

European Commission data shows that between February 2022 and June 2023, 52% of all state aid expenditures came from just one Member State—Germany. Another 28% was provided by Italy, followed by 9% from Spain. As a result, 89% of state aid expenditures were granted by just three Member States. Furthermore, the Draghi report highlighted that by the end of 2022, EUR 93.5 billion of crisis state aid measures (Cannas, Ferraro, 2023) were granted to EU companies, with 76% coming from Germany, 9% from Spain, and 5% from the Netherlands.

Another challenge in this policy area is the risk of inefficiency in public spending, a concern well noted in the literature.[2] Supporting large companies could lead to monopolies, stifle innovation, and hinder the adoption of best-market solutions. On the other hand, inaction may result in further deterioration of EU competitiveness.

A major difficulty lies in the complex interlinkages between many policy areas. Even in the Bruegel memo to commissioners (Demertzis, Sapir, Zettelmeyer, 2024), there is no direct focus on industrial

[2] E.g. Bruegel memo for internal market.

policy. Energy, trade, competition, the internal market, and defence all require strict cooperation and a shared understanding of industrial targets to succeed. This integrated approach has been key in the success stories of countries like South Korea, the US, and Finland. Without a clear vision of how these policies converge, they risk turning into a disorderly transition, where emissions remain high and neither industry nor the economy functions efficiently.

EU industrial production has also increased its dependence on materials from China. Between 2018 and 2022, the share of materials from China used in EU industrial processing grew by 1.2 percentage points, from 2% to 3.2%. While this may not seem alarmingly high, sectoral dependencies pose a significant risk to entire industrial processes, particularly in the electronics, automotive, and medical/pharmaceutical sectors.

Recommendations

1. **Provide sufficient financing. Any solutions on the industrial front are inextricably linked to the issue of financing**. Every policy action comes with a cost—whether it involves tariffs or border fees, local content requirements, regulatory issues, tax exemptions, or direct investments and innovation funds. Without adequate financial resources, any EU effort to help industry survive in a highly competitive global market will lack significant impact. Draghi has proposed EU debt, while Ursula von der Leyen suggested a European Competitiveness Fund. Both are promising ideas, but there is also a need to increase the EU budget (see own resources letter) to support industry and preserve the European economic model. **However, there is a temptation to opt for quick fixes, such as relaxing competition rules. Such actions could have serious repercussions for the coherence of the Single Market as well as for consumers** (Ilnicki et al. 2023)

2. **Twin industrial approach – high-tech and strategic manufacturing capacity**. The EU should compete with the US, China, and other global players in high-tech development while securing its share of world trade in goods. Although many innovative developments are occurring in services, industrial innovation boosts productivity (e.g., by reducing energy consumption) and reveals new frontiers and possibilities. Despite China's rise as an industrial powerhouse, the EU's exports of goods still account for more than 30% of its economy. However, manufacturing value added has declined to around 15% of GDP, while countries like South Korea and Japan maintain levels of 20% or higher.

3. **Strategic Manufacturing Capacity. Manufacturing capacity must be maintained or developed in key strategic sectors**. These include pharmaceuticals and medical instruments, computing and AI, clean tech, space, drones, defence, and transport (particularly automotive). In these sectors, capacity is essential for ensuring the stability of strategic supplies to the economy, society, and public health, as well as addressing hard defence issues (see defence letter). The Russian invasion of Ukraine has demonstrated that local content and secure, diverse supply chains are not optional but existential priorities for the EU. **The EU needs a capacity market for manufacturing, and several tools are available to achieve this, including local content requirements, EU procurement linked to "buy European" provisions, and the promotion of proximity economies**.

4. **Build Transatlantic Unity in Manufacturing Capacity**. The EU and the US need each other to foster competition while supporting each other's local priorities. Both should adopt a joint approach towards protectionist measures, such as "buy European/American," that are justified. Additionally, there could be a distinct level of support for "buy transatlantic" or even for

a broader group of like-minded countries. Such a policy would provide a minimum level of security for supply chains in preparation for potential future crises, whether it be China's invasion of Taiwan or further Russian aggression. **Achieving a decisive victory in Ukraine would also significantly reduce these risks by sending a strong message**.

5. **Don't Rely Only on Champions and Current Strengths. Establish an agency for large-scale innovative projects (similar to DARPA) and create a European program for pre-commercial procurement, modelled after Innovate UK's Contracts for Innovation (formerly SBRI)**. True innovation thrives in competition, so procurement should allow multiple companies the opportunity to create their own solutions to specific problems. EU innovation financing and projects should not be limited to a single project, company, or technology. Procurement needs to be bold, pan-European, and foster competition. While competitive bidding is a good practice, it can sometimes be too narrow in scope, financing, or overly prescriptive in terms of solutions. Projects should be long-term. **Narrowly defined bidding processes can be particularly challenging for companies from Central and Eastern Europe, hindering EU cohesion**. Therefore, procurement must create opportunities for future products and solutions that may not yet be visible or fully scalable (in a DARPA- or SBRI-like approach). **Officials must be prepared to make mistakes and to reverse or adapt policy priorities if they prove unsuitable for a changing reality**.

6. **Last but not least: Smart Regulation and Smart Deregulation**. The European Union is one of the best places to live, thanks in part to its strong protection of consumers, employees, and the environment. However, this comes at a price of regulatory burdens for businesses, particularly in the industrial sector. The focus should be on simplifying procedures, ensuring neutrality in how targets are achieved, and harmonizing regulations between Member States (see the digital telecom letter). While high standards can present a competitive burden for companies, the EU needs to level the playing field both within the single market and globally. Instead of lowering these standards, the EU can either protect the single market and subsidize exports or successfully implement the Brussels effect—promoting EU standards internationally.

   The EU single market itself must be strengthened to remain one of the most attractive markets globally. EU companies should view this market as safe and profitable, so they are not tempted to marginalize it in pursuit of higher profits elsewhere. By doing so, they risk losing sight of their social and territorial origins. The EU market must be made more profitable, offering stability and additional benefits for innovators.

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Trade Policy

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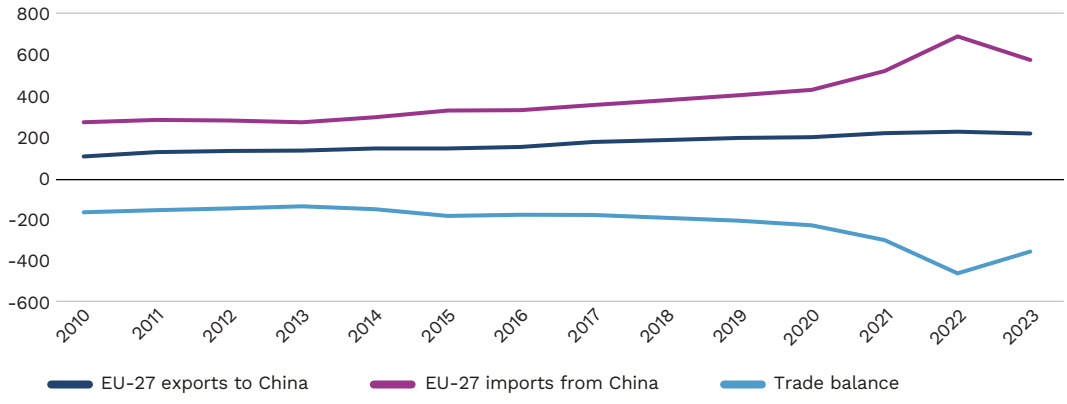
State of affairs

International trade is crucial for the EU as it drives economic growth, creates jobs, and enhances competitiveness. These issues have gained increasing importance in recent years, particularly due to emerging risks to the global trade system. Dependency on China and the lack of reciprocity in market access, coupled with disruptions in the global economy—especially the US-China trade war—pose significant threats to the stability of the international order. EU imports from China surged by over 80% from 2018 to 2022, resulting in a trade deficit of nearly EUR 400 billion in 2022 (Eurostat, 2024). It has become necessary to launch investigations and implement anti-dumping measures to safeguard European businesses and regional supply chains from unfair competition, particularly in sectors such as steel products, fibre optics, and clean-tech. These industries are essential not only for creating sustainable employment opportunities but also for achieving the EU's digital and carbon-neutral transition objectives.

Figure 10. EU-27 exports, imports, and trade balance with China, 2010-2023 (EUR bn)



Source: PEI's own calculations based on ITC data.

The EU is undeniably facing rising tensions driven by the growing assertiveness of key trading partners. China's restrictions on exports of gallium, germanium, and graphite—essential elements for electric vehicle battery production—highlight how such measures could unnecessarily disrupt supply chains and hinder the EU's efforts to revitalize, decarbonize, and enhance its competitiveness. Therefore,

the current tools for monitoring strategic dependencies, which aim at diversification, represent a positive step forward in reinforcing the resilience of Europe's value chains and industrial ecosystems.

The EU's economic security strategy (European Commission, 2023) prioritizes areas of critical importance to European companies amid geopolitical tensions. Threats stem from strategic dependencies that external entities, such as China or Russia, could exploit to exert pressure on member states. Additionally, the European economic landscape has been impacted by the adverse effects of COVID-19, Russia's aggression against Ukraine, trade liberalization with Ukraine, and the successive packages of sanctions imposed on Russia. These factors, occurring within a short time span, have undermined key pillars of competitiveness for businesses in Europe. In response, the EU has taken decisive steps to acknowledge the importance of critical raw materials, strengthen foreign direct investment screening, monitor outward investment risks such as technology leaks, enhance export controls on dual-use goods, and uphold the principles of scientific cooperation.

However, the EU's weakness, as outlined in Enrico Letta's report (Letta, 2024) and Mario Draghi's report (Draghi, 2024), lies in regulatory barriers and the inefficient utilization of intellectual and financial resources. This results in a limited willingness within European societies to embrace risk, hindering the growth of innovative companies geared toward global expansion from the outset. In contrast, societies like those in the US or China are less risk-averse. In China's case, the "cushion hypothesis" suggests that social networks can help mitigate financial losses, leading to a greater acceptance of economic risks (Shou, Olney, Wang, 2023). When combined with strong government support, this fosters a more effective integration of industrial processes and knowledge-intensive services, creating opportunities to enter new markets.

Challenges

In light of the shift toward selective protectionist practices, particularly from the United States and China, which challenge the principles of free trade, a smart compromise is necessary. The key challenge is to maintain free trade while consistently monitoring strategic dependencies and potential risks to European supply chains. For example, a typical automobile manufacturer works with around 250 primary suppliers, but this number escalates to 18,000 throughout the entire value chain (Taylor, 2023). With increasing tensions and potential disruptions, the focus is shifting from lean logistics to more expensive countermeasures aimed at building resilience.

In the realm of advancing technological capabilities in the US through various acts like the Inflation Reduction Act and the CHIPS and Science Act, **fostering collaboration between the EU and the new US administration emerges as a crucial task**. Potential scenarios of hard decoupling from China and new trade wars could pose significant obstacles for the EU, including the imposition of direct or indirect tariffs. Consequently, accessing the American market might become more difficult. This would potentially necessitate the implementation of protective measures by the EU to counteract Chinese oversupply. However, such actions may undermine the EU's credibility as a staunch advocate of free trade. Transatlantic cooperation will be essential in tackling unfair Chinese trade competition. The key question is how to align strategic infrastructure investments and policies to promote innovation and clean-tech manufacturing while ensuring open trade channels and enhancing mutual understanding of preferences with the EU's trade partners.

A critical issue is the debate surrounding the extent and nature of government schemes, particularly subsidies that undermine the principles of free and fair trade. Implementing policies that enhance the EU's strategic autonomy requires careful safeguarding of the common market to address its current

productivity challenges, as highlighted by Mr. Draghi. However, this approach may impose additional financial burdens on consumers—a trade-off that can only be justified if it does not stifle innovation by excessively incentivizing strategic sectors that might exploit these advantages for their own gain. On the other hand, there is no perfect solution, as remaining inactive could be seen as accepting an inevitable decline. Such inaction risks the relocation of jobs outside the EU, which would severely weaken the social and economic resilience of European nations.

Recommendations

1. **Diversification of trade relations is essential for economic security. It must remain a top priority for the European Union to reduce dependence on specific goods or raw materials, particularly those sourced from countries that do not prioritize stable relations with the EU**. In terms of incentives, investments in strategic infrastructure, as well as the transfer of technology and expertise to accelerate the industrial upgrading of developing partners, play a pivotal role in the success and longevity of these partnerships. Additionally, providing EU export and investment guarantees for businesses in key locations could serve as a valuable tool to support the expansion of European companies.

2. **Reciprocity of concessions (and barriers) stands out as the most effective solution**. Building upon its network of current trade agreements and strategic partnerships, the EU has the potential and capability to strengthen the international trading regime. Access to the Single Market not only fuels entrepreneurship but also offers emerging economies a well-defined roadmap for economic development, resilience, and integration into global markets. However, if another country imposes direct or indirect barriers to its market or pressures for technology transfers, the EU should adopt a reciprocal approach regarding access to the Single Market. Openness, aside from developmental assistance, should not be a one-way process.

3. **The EU urgently needs a new approach to tariffs. As emphasized by Mr. Draghi, the EU is strategically reshaping its trade policy to align with the evolving global landscape, where the once-dominant era of open world trade led by multilateral institutions is rapidly fading**. Now is the ideal moment for the EU to safeguard consumers, empower workers, and significantly boost budget revenues (see the letter on the MFF and budget). **Trade policy must also be tailored to support the European industrial strategy** (see the letter on industrial policy), requiring a thorough evaluation of each individual case. While a shift back to traditional, pragmatically enforced defence measures may seem radical after years of openness, this approach is essential for achieving the EU's technological sovereignty and defending fair international competition to avoid losing critical jobs and manufacturing capabilities.

4. **Building a level playing field for EU producers means promoting European standards in areas such as environmental provisions, intellectual property rights, labour regulations, and human rights**. Enhanced collaboration, especially within the EU-US Trade and Technology Council, is also highly necessary for addressing technical barriers to trade, including standards, conformity assessments, product quality, and safety requirements, which often require companies to allocate additional resources and time. This, in turn, would help to strengthen the competitiveness and resilience of European businesses.

5. Lastly, **it is imperative that the EU's trade agenda be carefully aligned with current economic security priorities**. A more robust coordination among trade, innovation, technology, and industrial policies is essential. Where the EU requires manufacturing capacity from a security

standpoint, trade policy should help ensure the competitiveness of European producers, potentially through protectionist measures. Additionally, the endorsement of strategic trade issues within the EU's foreign and security policy requires diplomatic backing. Exploring the most effective approach for this coordination, potentially through the creation of a European Economic Security Committee (Wolff, Steinberg, 2023), is essential. Involving businesses, academic institutions, and think tanks would enhance stakeholder engagement and support the development of anti-coercive responses.

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EU Own Resources and the New MFF

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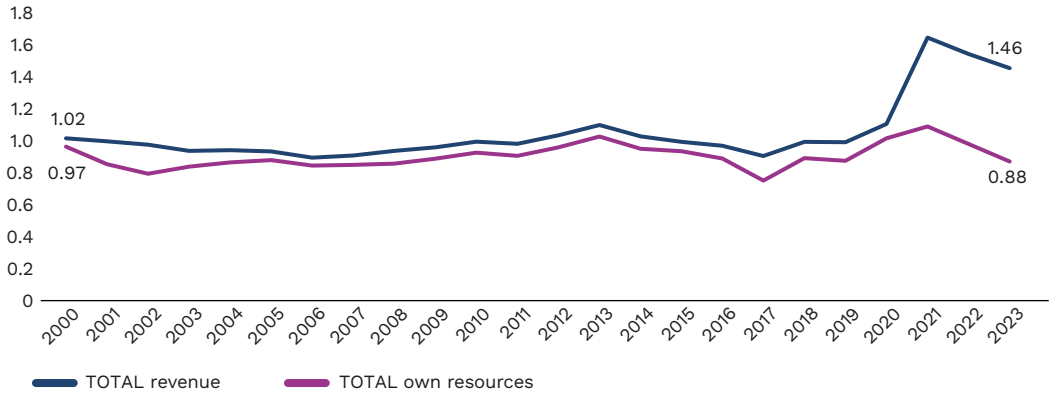
State of affairs

The EU budget is being pulled in two opposite directions: the desire to keep it as small as possible and the need to make it a more effective tool for governing the EU economy. Although there is a growing understanding of the importance of joint initiatives and global challenges, budgetary revenues have not grown in line with these increasing demands. It was only in 2020, with the introduction of the NextGenEU program, that debt instruments were included, allowing the EU to extend recovery financing for the economy. However, this was not accompanied by the development of new own resources and was labelled as a one-time measure. The total revenue from own resources has remained unchanged relative to the EU's GNI since 2000—still representing only 1% of the total EU GNI—and is primarily based on direct contributions from Member States. In addition to NextGenEU, another significant development occurred in 2022: the EU budget became a source of military support for Ukraine.

Figure 11. EU revenue and own resources (% of EU GNI, annually)



Source: PEI's own calculations based on European Commission data.

A real new own resource was introduced in 2021—the plastic packaging waste levy. However, it did not lead to an increase in the total own resources collected. In fact, it decreased in both absolute terms and relative to GNI since 2020. Revenues from non-recycled plastic waste accounted for only 5% of

total new own resources. One of the issues with this revenue source is its regressivity, a concern that was acknowledged even before its implementation. Additionally, it is paid by Member States as a contribution, not directly from the market. The calculation methods are inconsistent, and the European Court of Auditors (ECA, 2024) found that the European Commission's support for the implementation of this revenue was insufficient.

The search for new own resources, linked to the green and competitiveness agenda, also led to the creation of the Carbon Border Adjustment Mechanism (CBAM), which is currently being implemented and will become operational in 2026. However, the funds expected to be collected from this mechanism will amount to only around €1.5 billion (about 1% of the annual budget (www1)) by 2028 and will likely decrease over time as EU partners develop various carbon pricing measures. As with duties collection, the EU will retain 75% of the amount.

Deliberations on new own resources are ongoing, with several options being discussed. Among them is the implementation of a call rate on ETS-based own resources from all revenues generated by the ETS, as well as the potential introduction of the first pillar of the OECD agreement, which would allocate part of multinational companies' profits to jurisdictions where they actually sell their products or services. In response, the European Commission adjusted its proposal in June 2023 (European Commission, 2023), increasing the ETS call rate from 25% to 30%. With the OECD agreement stalled, the Commission also proposed a new own resource based on corporate profits (CPOR), calculated using statistical data on gross operating surplus in the financial and non-financial sectors. This mechanism is intended to operate until BEFIT (Business in Europe: Framework for Income Taxation) comes into force.

Other potential sources of own resources analysed by the EU Commission and Parliament include a Financial Transaction Tax and a tax on food waste. In a resolution from May 2023 (European Parliament, 2023), the European Parliament suggested additional options, such as a digital tax, taxing large corporations operating in the single market, an excise tax on share buybacks, a withholding tax, and income from the confiscation of wealth earned through criminal actions.

Challenges

The EU must be prepared to confront the changing international situation and economic landscape. This is the real challenge for the EU, not the often-discussed issue of repaying the NextGenEU debt. The pandemic was a crisis that led to the joint issuance of bonds, but the Russian invasion of Ukraine has revealed how vulnerable the EU is to external shocks, which could be even more significant than the pandemic. The stagnation of the EU's economy—most notably the widening productivity gap with the US—and the extremely high costs of energy highlight the scope of economic challenges that need to be addressed more effectively at the EU level rather than by individual Member States. **A robust and effective response will require joint action**.

The EU must find a source of financing for such a joint response. The challenge is that both external risks and the need for a reliable source to repay NextGenEU are urgent and cannot be delayed (Claeys, McCaffrey, Welslau, 2023). NextGenEU will require about €25 billion annually from the common budget starting in 2028. Without increasing the budget, the financing of other key EU initiatives, as well as those that still need to be launched in response to future military and economic risks, may be reduced. The upcoming negotiations on the Multiannual Financial Framework (MFF), set to begin in 2025, highlight the urgency of this challenge for the new European Commission. This urgency is further underscored by the Political Guidelines from Ursula von der Leyen, which propose new financial initiatives such as the European Competitiveness Fund.

The challenge lies in defining what constitutes a fair share of contribution. Is the GNI-based own resource an inadequate method, or is it a fair contribution linked to the income of each Member State? While Member States that are still catching up with the EU's development level seek support, net contributors to the EU budget aim to reduce their financial obligations. Both positions overlook the importance of the EU budget, which is essential for financing the twin transition, boosting the EU's productivity, and supporting Ukraine and the EU's military build-up. The global political landscape will only make these challenges more pressing. **A strong EU budget will enhance the EU's credibility and provide greater flexibility to defend its competitiveness—crucial points highlighted in both the Letta and Draghi reports**.

There is an extensive discussion around the Capital Markets Union, often mentioned as a remedy for the need to increase EU budget financing. Boosting capital markets in the EU to enhance competitiveness and productivity is a clear priority. However, it is not valid to view this as a substitute for the EU budget. Draghi also strongly emphasizes in his report that boosting investments can only be successful if public financing is also increased, covering approximately one-fifth of the financial needs. Both are complementary and necessary to make the EU economy more competitive.

Recommendations

1. **Aim for extending EU budget on a permanent basis**. It will be a difficult task to ensure that the EU budget can meet the challenges ahead: boosting the EU's growth, building the capacity to defend Europe militarily, and protecting against unfair global competition. The diverse attitudes of Member States will pose an obstacle to a common approach. **The European Commission should resist burying its head in the sand and instead present an ambitious strategy, proposing to break the 1% GNI budgetary ceiling and make the NextGenEU and GNI-based own resources strong foundations to build on**. The 20% of the €800 billion investment needed for the twin transition, as reiterated by Draghi, amounts to about €160 billion—roughly an additional 1% of Member States' GNI.

2. **Look for new own resources. An ETS-driven own resource might be theoretically seen as a good proposal, though a temporary one—as green transition efforts progress, those contributions will steadily decrease**. The energy transition also requires spending money where decarbonization is most needed; thus, these funds should be allocated to support decarbonization policies in the regions where they are collected. There is a clear need to find more stable sources of financing for the EU budget. **Given the financial stability achieved partly through public support during the financial and debt crises, the financial sector could now contribute to the EU budget. This could take the form of a financial transaction tax or a different scheme, but it should be accompanied by policies that strengthen EU capital markets**. Contributions based on company profits that mostly benefit from the single market should be considered an interesting option, as well as broader border taxes, as suggested by Pascal Saint-Amans (Saint-Amans, 2024). Some form of withholding tax or a domestic minimum top-up tax could help prevent tax leakage, which lowers investments in the EU and disrupts redistribution efforts. To discourage the relocation of production to other regions, the EU could also consider implementing an exit tax on companies leaving the EU market for another region.

3. **Consider raising tariffs and tariff strategy linked to industrial policy. The EU should consider expanding its approach to border taxes and fees by increasing tariff revenues, which could also support its strategic industries**. The U.S. is raising its tariffs, and this trend is unlikely

to change regardless of who wins the 2024 presidential election. In 2023, U.S. duties collected amounted to nearly $100 billion, while the EU collected just under $31 billion. China also generates more revenue from tariffs than the EU. While duties will not constitute a major revenue source for the EU overall—comprising both national and EU budgets—a smart industrial policy with a targeted tariff strategy could significantly contribute to the EU's own resources. **This could help close the gap for NextGenEU repayment**, while also serving multiple public policy goals by aligning budgetary, industrial, environmental, and climate objectives. In the trade policy letter, we also address the issue of reciprocity—China's weighted average tariff on EU non-agricultural products is nearly 8%, while the EU's is only 2.7%.

We should also remember that the most stable sources of financing are those linked to economic growth. GNI-based revenues, or those connected to VAT or personal income, can reduce the regressive nature of own resources and build enduring EU revenues for the decades ahead. While environmental taxes may serve specific policy goals, they cannot be considered a reliable long-term source of financing for key public policies.

4. **Maintain cohesion by taming extensive state aid. If the loosened state aid regulations are to remain, the European Commission should introduce a tool to equalize the benefits, such as a state aid fee, as suggested in Letta's report**. Uneven distribution of state aid could distort the internal market. To address this, Letta proposed a fee on state-driven support, with the revenue directed toward pan-European projects. The European Commission should deliberate on this idea, defining what constitutes excessive state aid—not to block it, but to tax it in support of common single market goals or to maintain cohesion and a level playing field within the EU.

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EU Enlargement – Ukraine

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State of affairs

Russia's aggression against Ukraine should serve as a catalyst to strengthen the EU's neighbourhood policy and seize this historic moment for the next enlargement. The tasks of the Commissioner(s) will include the integration of all current EU candidate countries, with a focus on treating each individually. However, Ukraine, the largest of the candidates, will inevitably face the most significant challenges. This is why we are addressing Ukraine's accession to the EU in this letter.

Contrary to what Vladimir Putin intended, **Russia's brutal war of aggression against Ukraine has made Ukraine's accession to the EU more likely than ever before**. The invasion, aimed at blocking Ukraine's Western aspirations, has paradoxically strengthened these desires within Ukrainian society. **Before the annexation of Crimea, support for EU integration was below 50%; it now stands at almost 80%**. This strong determination is also evident at the political level. The opening of negotiations for Ukraine's accession to the EU is a political recognition of the reforms the country has managed to implement, even under wartime conditions.

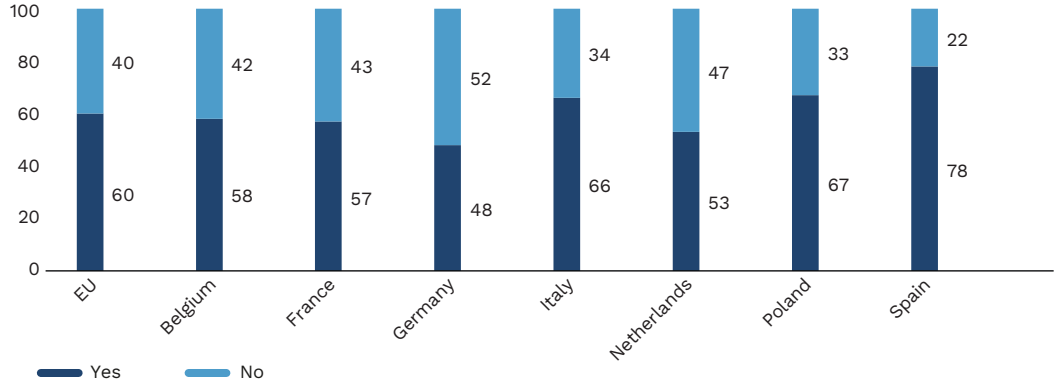
An unprecedented shift has also occurred in EU policy. From the EU's perspective, the enlargement policy crisis had seemed difficult to overcome. The EU had largely abandoned its ambitious goals for its southern neighbourhood, and negotiations with Turkey, ongoing since 2005, had stalled. Both Turkey and the Balkans saw a marked decline in democratic standards and a slowdown in economic development, which provided a convenient explanation for the EU to pause further enlargement after Bulgaria and Romania joined in 2007, followed by Croatia in 2013. For some candidate countries, foreign policy became a fundamental issue, including the rapprochement of Turkey and Serbia with Russia.

The resilience of the Ukrainians united EU member states and prompted the Union to act with unprecedented speed. By the end of 2023, support for Ukraine's accession to the EU stood at around 60% across EU countries (Hoffmann, de Vries, 2024). A major shift also occurred in the EU's policy towards Russia, which had previously undermined the EU's Eastern policy. Although sanctions on Russia were introduced too slowly and had several loopholes, they made many member states realize that the European economy could function without Russian involvement. **Ukraine has revitalized the EU's external policy, and the formal start of accession negotiations with Ukraine and Moldova in June 2024 could mark the first effective step towards the EU's next enlargement in years**.

Accession to the EU for a country as large as Ukraine would be a significant challenge, even in times of peace, making the accession negotiations particularly complex in the current case. These negotiations are divided into six thematic clusters comprising a total of 32 chapters. The chapters on the so-called fundamentals (cluster 1), access to the single market (cluster 2), and agriculture and cohesion policy (cluster 5) appear to be the most difficult for Ukraine. Negotiations in the first cluster, which covers the fundamentals, will address areas that Ukraine has struggled with since 1991: the quality

of democratic institutions, the rule of law, and transparency in government operations. **It will be crucial for the European Commission to establish transparent criteria for progress to motivate Ukraine to continue its reform efforts**.

Figure 12. Distribution of answers to the question "Should the EU accept Ukraine as a member state in the coming years?" (a survey conducted in December 2023)



Source: PEI's own calculations based on Bertelsmann Stiftung (Hoffmann, de Vries, 2024).

Cluster 2, which concerns the internal market, will focus on economic integration and Ukraine's inclusion in the four freedoms of movement: goods, services, capital, and people. Following the introduction of Autonomous Trade Measures (ATMs) in 2022, which provided complete trade liberalization and a duty-free market for all Ukrainian goods entering the EU, it became clear that these issues could lead to tensions. Negotiations on cluster 5, on agriculture and cohesion policy, will be challenging, among others, due to the need to allocate resources for Ukraine's inclusion in the Common Agricultural Policy and Cohesion Policy. **To illustrate, in 2023, Ukraine's GDP per capita, measured in purchasing power parity, was only about 30% of the EU average. This highlights that enlargement will be closely tied to the need for the EU to increase its own resources**.

The prospect of EU enlargement presents both opportunities and significant uncertainties. There is an opportunity to break down previous barriers in relations between Ukraine and EU countries, achieving a new level of integration that will drive economic and social development for both Ukraine and the EU, on a win-win basis. Indeed, **Ukraine's accession and development could provide the EU, especially Central Europe, with a substantial transformational boost**.

Challenges

Firstly, the accession negotiation process with Ukraine will be particularly challenging due to the likely continuation of Russian aggression, meaning that Ukraine's borders will remain unsettled. Our main task is to force Russia to end the war and accept the choice of the Ukrainian people. As this may take time, the process of Ukraine's integration with the EU should advance in parallel. Given the ongoing defensive war, with the survival of the state and the pro-Western aspirations of Ukrainian society at stake, a flexible approach to accession requirements will be necessary.

Secondly, Ukraine must undertake difficult reforms to comply with EU requirements. While this presents a significant opportunity to strengthen Ukraine and make it more resilient, it is crucial that these reforms not only involve the adoption of EU legislation but also its effective implementation and enforcement—areas where Ukraine has struggled in the past. The credibility of institutions and the legal environment have been weaknesses for Ukraine, particularly in the eyes of foreign investors. Addressing these issues will help attract foreign investment, which is also a significant opportunity for the EU, as it could boost the Union's competitiveness, offer high returns on investment, and significantly expand the single market.

Thirdly, maintaining public support in Ukraine for integration will be challenging, particularly against the backdrop of difficult reforms and the costs Ukraine is incurring due to the war. Integration will require increased investment by both the private sector and citizens. While the introduction of European environmental and quality standards in production will improve the quality of products and services, it will also impose significant financial costs on producers, which may be reflected in the prices of final goods. This poses the risk of declining support for reform. Additionally, a decrease in the political elite's commitment to change in Ukraine could slow the pace of reforms, especially in areas like anti-corruption. In turn, the slow pace or ineffectiveness of reforms could raise doubts among citizens about the benefits of EU membership.

Fourthly, a significant challenge lies in overcoming internal divisions within the EU and addressing the credibility gap regarding enlargement. Member States are divided in their attitudes towards enlargement. Central European countries, particularly Poland and the Baltic States, are in favour of rapid enlargement once Ukraine meets the necessary criteria. However, Hungary's openly oppositional stance on enlargement remains problematic. Additionally, support for enlargement has historically been low in many other EU countries. Political elites in the Netherlands, Austria, and France, in particular, have been sceptical of further expansion. Countries bordering Ukraine will bear the brunt of both the positive and negative consequences of enlargement. Therefore, a major challenge will be the debate over resource distribution in the EU budget, especially concerning cohesion policy and the Common Agricultural Policy.

Fifthly, Russia is likely to continue using disinformation campaigns to stoke public fears regarding support for Ukraine and its accession to the EU. Maintaining support for Ukraine's chosen path will require effective countermeasures against such tactics.

Recommendations

1. **Ukraine should have a clear prospect for its accession to the European Union**. This does not mean setting a fixed accession date in advance, but rather ensuring that tangible benefits emerge as reforms progress. **The EU must be prepared to act swiftly and decisively to seize this historic moment** and avoid a scenario in which long-drawn-out accession negotiations are not matched by reforms in Ukraine, or where the will for enlargement among Western societies diminishes. While setting a specific date may not be necessary, **it is important that the prospect of accession is framed in terms of years, not decades. Opening of the first negotiation chapters already in 2025 will make accession in the early 2030s realistic**. The principle of conditionality, already in place during the negotiation phase, should include access to pre-accession funds that will support Ukraine's further integration. This conditionality should also apply to the liberalization of access to the EU's single market, the single most powerful driver of economic growth for EU member countries.

2. **Careful monitoring of Ukraine's reforms will be crucial to ensure their effectiveness and sustainability, particularly for key negotiating chapters within cluster one (fundamentals) and cluster two** (single market). It is important to avoid the 'enforcement gap,' meaning the gap between the formal adoption of legislation and its actual implementation. **It is worth planning how to strengthen the capacity of the Ukrainian administration so that it can cope with the reforms**. Only by carrying out real reforms can Ukraine build credibility in the eyes of foreign investors and fully benefit from EU integration. Clear communication of membership requirements and thorough monitoring of reforms will help prevent sceptics from using the rule of law issue to block enlargement.

3. **Ukraine's progress on the reform path should be accompanied by a phased integration into common EU policies**. For instance, it may be mutually beneficial to integrate Ukraine into the EU's energy policy. This should involve developing transmission infrastructure to facilitate increased trade in gas and electricity as Ukraine gradually integrates into the European energy market. **The inclusion of Ukraine in joint projects within the frameworks of EU transport and energy policies is strongly advocated** in Mario Draghi's report on competitiveness (2024). The report specifically highlights the need to strengthen solidarity corridors between the EU and Ukraine and proposes the creation of financial mechanisms, such as guarantees, to incentivize businesses to utilize Ukraine's gas storage facilities for the EU's needs. The development of such instruments could foster integration even before formal enlargement.

4. **Maintaining support for enlargement within EU countries could be facilitated by introducing a compensation mechanism to address the effects of integration, a proposal put forward by Enrico Letta in his recommendations for single market reform** (Letta, 2024). This mechanism would aim to mitigate potential negative economic and social impacts that may arise in existing member states after liberalizing access to the EU market for new members. The compensation scheme should include financial support for the economic sectors most vulnerable to change and act as a pre-emptive measure against potential tensions. Such measures could strengthen cohesion and stability within member states and help prevent the emergence of trends similar to those that led to Brexit.

5. **The EU must be prepared for Russia's hostile actions and demonstrate its determination to integrate Ukraine. A firm policy toward Russia, including sanctions and the use of Russian assets for Ukraine's benefit, is essential to counter Russian attempts to destabilize EU-Ukraine relations**. There is no indication that Moscow will abandon its strategic objective of halting EU enlargement in the post-Soviet region. It is likely to resort to disinformation, escalate hybrid actions, and support movements opposed to enlargement, including lobbying business elites who have previously benefited from Russia-EU trade.

6. **It is necessary to consider additional sources of funding. Resources are currently needed to support Ukraine in its defensive war, reconstruction efforts, and reforms to deepen integration into the European community**. It is also essential to consider the post-accession budget, particularly funding for cohesion policy. Enlargement must therefore be accompanied by a reform of the EU's own resources (see our letter on the MFF) and a strategy for industrial policy that ensures the EU's competitiveness in global markets (see our letter on industrial policy). An enlarged EU with Ukraine has the potential to benefit from greater human capital and natural resources, which will aid in green and digital transformations. **However, the primary point is that Ukrainian society is currently paying the price in blood for European values and the expansion of the area of security and prosperity—demonstrating that the European project still holds immense power to change the world**.

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Migration

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The text below written in August 2024 discusses the main opportunities and changes related to migration within and into the European Union, focusing particularly on the perspective of Central and Eastern European members.

State of affairs

Migration within the EU

The big bang enlargement of the European Union in 2004, when ten mostly Central and Eastern European countries joined, followed by the accession of Romania and Bulgaria in 2007, **marked the beginning of a distinct period in the history of intra-EU migration, during which East-West, rather than South-North, movements were the main source of workers for employers in Western Europe**. This period has now ended, partly due to reduced opportunities after Brexit but largely due to demographic and economic changes in the 'new' EU members, which are undergoing a migration transition and becoming immigration destinations in their own right (Górny, Kaczmarczyk, 2019; Okólski, 2021). Although intra-EU migration (often termed mobility or free movement) continues, its directions are more diverse, and it no longer seems justified to single out post-accession migration as a distinct type of intra-EU mobility (Garapich et al., 2023; King, Okólski, 2019; Pszczółkowska, 2024; White, 2022). Given Central and Eastern Europe's economic development and the demographic decline of most member states, intra-EU migration alone will not suffice. All regions will need to source labour from outside the Union's borders, particularly in less attractive sectors such as care or agriculture.

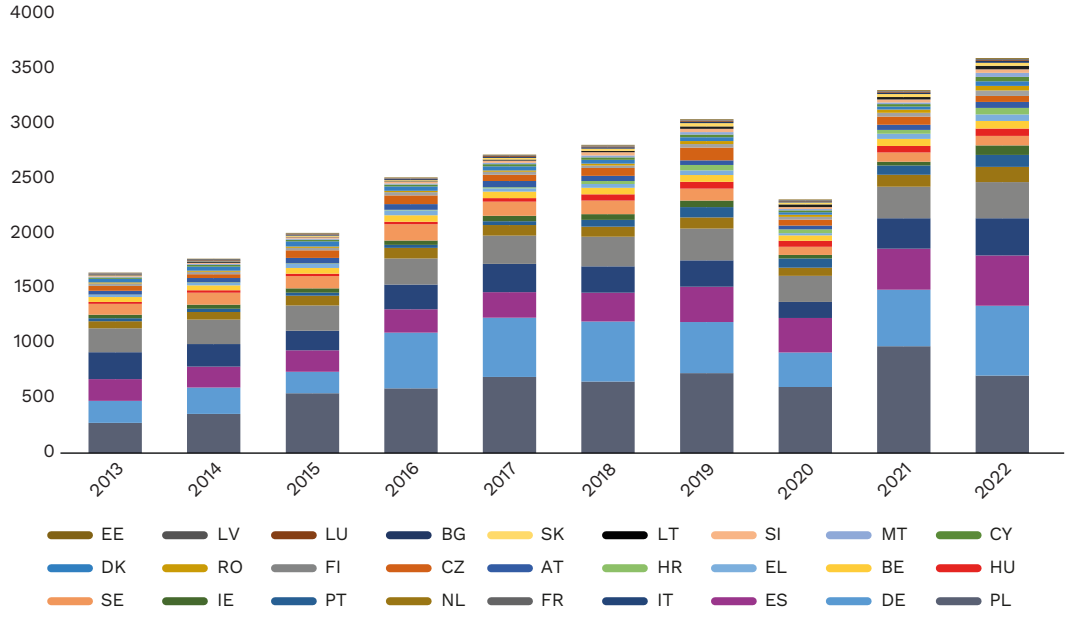
The UK's departure from the European Union has deprived today's young Europeans of some of the opportunities that their parents or older siblings enjoyed, particularly in the realm of education. EU students wishing to study full-time in the UK, home to some of the world's leading universities, now face formidable financial obstacles, including high tuition fees (often exceeding €30,000 per year), as well as the costs of a student visa (sometimes more than €1,000) and public health insurance in the UK (between €900 and €1,200 per year). As a result, applications from EU students to UK universities have dropped from over 40,000 in the years preceding Brexit to just over 20,000 in recent years (UCAS, 2021, 2023), with even steeper declines from less wealthy countries like Poland and Romania. The proportion of EU students admitted to top universities, such as the University of Oxford, is now below 4% of all admissions, compared to over 7% before Brexit (University of Oxford, 2023). While admission to top universities is an elite pursuit, related issues affect a much broader group.

Migration into the EU

To date, employers in Central and Eastern Europe, particularly in countries like Poland and the Czech Republic, have relied on temporary labour from Ukraine and other non-EU European countries to address workforce shortages. In Poland, this reliance was facilitated by a system of temporary work

visas, issued based on employers' declarations of intent to hire foreign workers, primarily Ukrainian citizens. These regulations fostered patterns of circular or incomplete migration (Okólski, 2012). However, the Russian aggression against Ukraine in 2014, and especially in 2022, altered this dynamic, pushing an increasing number of Ukrainian migrants to establish permanent homes in Poland and other EU countries (Górny et al., 2023). The already substantial migration from Ukraine to the EU surged dramatically in 2022 due to the mass exodus of war refugees. The European Union's response—the activation of the Temporary Protection Directive, which granted refugees access to labour markets, healthcare, education, and social benefits—was driven by humanitarian considerations but also generated economic benefits for host countries, particularly Germany and Poland, due to refugees' participation in the labour market and their spending of earnings from Ukraine in these countries (Duszczyk et al., 2023). A distinguishing feature of this group was their high level of education, with many continuing to work online for employers in Ukraine (Górny, 2023). As a result, a significant portion of this population is leading transnational lives, with family and professional activities occurring simultaneously in both their country of origin and destination. This presents both challenges and opportunities for Ukraine and the receiving countries.

Figure 13. First residence permits granted by EU countries in a given year (thousands)



Source: PEI's own calculations based on Eurostat data.

Although Ukraine and other European countries continue to be important sources of workers, these sources have proven insufficient. As early as the second decade of the millennium, employers across the region—from the Baltics to Bulgaria and Romania—were increasingly recruiting employees from other continents, particularly Asia. By 2019, Poland became the leading issuer of residence permits for employment in the EU (Eurostat, 2023). **Due to the war in Ukraine, Central and Eastern European**

employers faced an even greater shortage of male workers, particularly in sectors like horticulture and construction. In practice, Poland (along with Hungary and other states) implemented a very liberal immigration policy, which stood in stark contrast to the government's anti-immigrant rhetoric. Following the October 2023 election, the new government set out to develop a formal migration policy (currently in progress), while its migration-related rhetoric became only slightly more nuanced than that of its predecessors.

Despite Poland's and Hungary's votes against the EU's new Migration Pact (primarily due to opposition to refugee relocation), and the abstentions of some other Central and Eastern European countries, the policies implemented in practice were similar to those in other parts of the EU. Countries in the region responded to the influx of asylum-seekers, orchestrated on the EU's eastern border by Belarus and Russia, with pushbacks.

Challenges

Despite the above-mentioned shortages of workers, political debates on immigration and asylum in the EU, both at the European and most national levels, have primarily framed migration and asylum as security issues. While border control is indispensable—especially given the hybrid war waged by Belarus and Russia—it is far from the only migration-related issue requiring attention. **Political debates on migration, even those involving mainstream political parties, often fail to reflect the actual challenges and benefits of foreign inflows into the EU and other developed countries**. The declared aims of limiting migration are often disconnected from real policies, which in practice facilitate the necessary inflow of workers (Hein de Haas, 2023). **At the same time, Central and Eastern European countries are not focusing on implementing integration policies, thus repeating some of the mistakes made by their Western European counterparts**.

The EU's efforts to prevent asylum-seekers and other migrants from crossing its borders have led to human rights violations through pushbacks and the 'outsourcing' of Europe's border security to neighbouring non-democratic or unstable states, particularly in North Africa (Hayden, 2021). The so-called Migration Pact, passed in 2024, aims to enhance the security of EU borders, partly by speeding up decisions for asylum-seekers and deporting those who do not qualify. However, some of its provisions raise legitimate concerns that the human rights of migrants may not be fully respected.

Recommendations

1. **The European Union should include citizens of candidate countries in the European space of free movement as soon as possible**, well before their countries officially join the EU. Previous enlargements did not set a good example in this regard, as businesses gained access to markets, investment opportunities, and the EU's fundamental freedoms before citizens did. Today's situation, where Ukrainian citizens already have access to the EU's labour markets, presents an opportunity to implement this freedom permanently. For the EU, this would help attract needed workers. For Ukrainian citizens, it would provide a sense of stability, rather than leaving them

waiting for temporary rights to be extended. Given that many Ukrainian migrants currently lead transnational lives, offering flexibility and leaving the choice up to them seems like the best solution. This approach is also less likely to deplete Ukraine's demographic resources by forcing people to choose one permanent place to live.

2. **Strong support for a judicious implementation of the EU Migration Pact**. The effectiveness of border protection—a key aim of the EU's new Migration Pact—and the potential for human rights violations at the borders will largely depend on the resources allocated for its implementation. Without sufficient financial and human resources, the EU's borders will not be more secure, and rushed decisions by overburdened staff may lead to injustices. In recent years, many countries have struggled with the implementation of their asylum and immigration policies due to inadequate staffing, particularly in consular and asylum offices. For the new regulations to bring meaningful improvements, they must be supported by significant investments, especially in staffing, both by border countries and the EU as a whole.

3. **More opportunities for labour migration into the EU**. One of the reasons for 'bogus' asylum applications from individuals who do not meet the legal definition of a refugee is that, despite their difficult economic circumstances, they have no other legal avenue to seek employment in wealthier countries. While the EU increases its efforts to protect its borders, it should also provide more opportunities for individuals to apply for work in the EU, particularly for those with in-demand qualifications. Additionally, more resources and attention should be devoted to the integration of migrants, including those with temporary residence rights.

4. **Free movement of students and academics with the UK**. A final recommendation concerns the migration of EU citizens. The recent change in government in the United Kingdom, along with the new administration's willingness to negotiate with the EU, presents new opportunities. The European Commission's proposal for an agreement on youth mobility (European Commission, 2024) has been met with a lukewarm response from the UK, but both sides should make every effort to ensure that their young generations have opportunities similar to those enjoyed by previous ones. A return to domestic tuition rates for EU students in the UK (and vice versa), reduced visa-related costs for students and academics, and the UK's full participation in European research programs that promote knowledge exchange and co-creation are essential.

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