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focused on collaborative research with the aim of “*building a new industrial revolution*” with a specific focus on information technology (Owen, 2012). ESPRIT was born as an attempt to respond to the government-led initiatives that the Japanese Ministry for International Trade and Industry undertook, initiatives that successfully enabled Japan to catch-up quickly with the United States as a technological and economic leader, particularly in the field of semiconductors. ESPRIT is typically considered the precursor of the European Commission’s framework programmes (starting in 1984), through which the Commission carries out science, technology and innovation policy and collaborative research initiatives. The current framework programme is Horizon Europe.

During the 1990s and early 2000s, liberalisation programmes continued in Europe. A consensus emerged at EU level on the preference for a more holistic, integrated and ‘horizontal’ approach to industrial policy. The role of the EU was to ensure the right framework conditions, focusing on the use of internal market and competition instruments, and stimulating R&D and innovation. This cumulated in the 2000 Lisbon Strategy: a programme “*aimed at creating a more competitive and dynamic knowledge-based economy*” (European Council, 2000). Its goal was to implement a comprehensive strategy of structural reforms by boosting innovation and investment in R&D and creating a more integrated and competitive internal market.

2 Europe’s industrial policy revival

The Great Recession of 2008 marked the start of a new era, characterised by an industrial policy revival across Europe.

In 2012, the European Commission published a new industrial policy communication, ‘A Stronger European Industry for Growth and Economic Recovery’ (European Commission, 2012), which started from the premise that “*Europe has a strong industrial base*” and sets out a roadmap

for reindustrialising Europe, with the aim of “

at shock, with all the issues related to the emergency procurement of personal protective equipment and vaccines, triggered a substantial revision of the new industrial strategy, which came in May 2021.

The updated strategy centered on the strengthening of the resilience of the single market. It did so by putting a strong focus on the need to improve Europe's "resilience" in key areas including health and green and digital technologies by diversifying international partnerships, developing Europe's strategic industrial capacities and monitoring strategic dependencies (European Commission, 2021).

Since then, the issue of 'open strategic autonomy' has become more and more central to Europe's industrial policy debate, also as a result of the war in Ukraine, the subsequent energy crisis and the overall increase in international tension linked to the geopolitical decoupling of the United States and China. At the core of this issue stand the risk of supply disruption for critical items (including vaccines during a pandemic, natural gas during a major energy crisis, and critical raw materials and clean technologies during the green transition) and the consequent quest for 'de-risking'.

This paradigm change first became evident with the European Chips Act proposed by the European Commission in February 2022 to address the shortage of chips during the COVID-19 crisis. The Act has the double objective of improving the resilience of the semiconductor ecosystem in the EU to minimise future supply chain disruptions and increasing Europe's domestic capacity for chip production. It rests on three pillars: research and innovation policies, subsidies for cutting-edge chip manufacturing plants, and measures to monitor and intervene in chip-supply crises. The Act seeks to attract foreign investment and coordinate with global partners (European Commission, 2022). Yet, it has also raised concerns about its emphasis on protectionism and its potential to create competition distortions (Poitiers and Weil, 2022).

When it comes to resilience in the face of supply risks associated with the green transition, the European Commission published in

March 2023 two legislative proposals reflecting its new policy framework in this area: the Critical Raw Materials Act (CRMA) and the Net-Zero Industry Act (NZIA).

The CRMA is an attempt to respond to the supply disruption risk in critical raw materials, mainly by boosting their domestic production, refining and recycling. The proposed Act identifies a list of strategic raw materials that are considered crucial for the manufacturing of green, digital and defence technologies, and then sets precise domestic targets to be achieved by 2030. The CRMA aims to make the issuing of permits to relevant industrial projects subject to a common EU deadline. The proposed act also includes provisions on supply chain monitoring, stockpiling and improving the recyclability of CRMs. The CRMA acknowledges that, while important, domestic actions will never make the EU self-sufficient in critical raw materials. The Act thus also puts forward an international strategy to diversify the EU's imports of critical raw materials and strengthen its global partnerships with emerging markets and developing economies, and to consider a 'critical raw materials club' for like-minded countries.

The proposed NZIA meanwhile aims to tackle the supply disruption risk in clean technologies by:

1. Listing the net-zero technologies that are considered to be strategic: solar photovoltaic and solar thermal technologies; onshore wind and offshore renewable technologies; battery/storage technologies; heat pumps and geothermal energy technologies; electrolyzers and fuel cells; sustainable biogas/biomethane technologies; carbon capture and storage (CCS) technologies; grid technologies.
2. Adopting an overall headline target of reaching a manufacturing capacity for these technologies of at least 40 percent of the EU's annual deployment needs by 2030. It also proposes a target for an annual injection capacity in CO₂ storage of 50 million tonnes of carbon dioxide by 2030, to spur the development of CCS.

3. To achieve these targets, EU countries can identify Net-Zero Strategic Projects (NZSPs) that will be granted priority status at national level and fast-tracked in permitting procedures.

3 Europe's industrial policy trilemma

The final shape of the NZIA and CRMA will ultimately emerge from the EU legislative process, ongoing at the time of writing (Tagliapietra *et al.*, 2023). However, both proposals are clearly underpinned by a de-risking approach, that has recently become an integral part of policy for both the EU (Von der Leyen, 2023) and G7³.

The historical discussion in section 1 shows how such concerns are not new to Europe or the world. Discussions about the economic and security challenges posed by China's emergence as a global economic power mirror the unease felt by European governments in the 1970

what does this mean in terms of moving away from the traditional economic efficiency paradigm? How far to move away from a horizontal policy approach to shaping of framework conditions, such as through strong competition policy and open trade? To what extent can technologies and projects deemed to be strategic be selected, requiring resilience/autonomy to secure supplies? How can these trade-offs be minimised, for example by fostering technological innovation to substitute critical inputs, rather than investing in expensive import

enabling the entry of new firms to challenge less efficient incumbents is crucial.

There is also agreement on the need for more directionality in industrial policymaking. *E-ta* choices will have to be made about technologies and projects that contribute most to the multidimensional objectives, but which are impeded by market, system and transition failures, even if the risk of selection failures is high. Managing this risk of government failure calls for a good mix of vertical and horizontal instruments, bottom-up and top-down selection, limiting support in time and the importance of ensuring competition as a level playing field. Recommendations range from establishing agencies modelled after the United States Defense Advanced Research Projects Agency (DARPA) to conducting complexity analysis of value chains, all with the goal of developing flexible policies that can be evaluated regularly and adjusted accordingly.

The success of industrial policy will be defined ultimately by whether it succeeds in unleashing private-sector investment to meet society's targets in a globally competitive and resilient manner, putting public-private partnerships at the core of industrial policymaking. The authors in this volume call for explicit policies and continuous collaboration between firms and governments to establish objectives that promote the creation of 'good jobs'.

Building coalitions at domestic and international levels, even among countries that may be rivals in other areas, is of paramount importance to navigate the green transition and other transformative processes effectively. The regional dimension is particularly crucial for a 'smart industrial policy,' whether focused on green initiatives or not. While some argue that efficiency and a region's inherent comparative advantage should guide industrial policy, others caution against straying too far from industry economics. Caution is also advised when pursuing national interests through industrial policy, as this may trigger an international race for subsidies, adversely affecting developing countries and potentially accelerating deglobalisation. Overall, this

Blueprint offers recognition of the benefits of an industrial policy that supports international coordination and even cooperation, rather than adopting a short-sighted Europe-first approach. These reflections are addressed in different ways by the contributing authors, as follows:

Chapter 2, *Accelerating Europe's Growth* (Philippe Aghion), asserts that industrial policy is essential for the competitiveness of EU industry and to catch up with the technology frontier. The core question is how to redesign the governance of industrial policy to make it more compatible with competition and innovation-led growth. Governments should focus support on skill-intensive sectors or sectors subject to high competition, to stimulate productivity growth more efficiently. However, by subsidising incumbent firms, governments should not deter new, higher-performing firms from entering the market. The author also calls for updated interpretations of the Stability Pact, competition policy and the single market, and EU borrowing to enhance Europe's investment capacity, make it more competitive at the global level and avoid irreversible decline. The author also advocates a European DARPA to ensure the competitiveness of EU industry, with projects funded from participating nations' budgets and by joint-EU borrowing.

Chapter 3, *Productivity and Growth: A New Paradigm* (Dani Rodrik), turns to the labour aspect of industrial policymaking. The author proposes a new paradigm of 'productivism' to enhance the productivity of all parts of society through a collaborative effort involving government agencies and private firms. Productivism focuses on incentivising worker-friendly technologies and improving the quantity and quality of jobs available for less-educated and less-skilled members of the workforce. Industrial policies should encourage improvements on both the demand and supply sides of the labour market. This requires customised and targeted business incentives, and dialogue between government agencies and companies to identify constraints and opportunities and design interventions accordingly. To help create 'good jobs', regional business

bureaux should be set up – or strengthened – to work alongside public employment services to provide customised services to local firms and investors.

Chapter 4, *Industrial Policy* (Uwe Cantner), focuses on the main driver of industrial policy at EU level: innovation and how to assure that innovation works as driver for industrial policy while assuring strategic autonomy or sovereignty in technology. The chapter discusses what obtaining technological sovereignty entails, what policies could be needed to achieve this, and when it is better to leave it to the market. The chapter sets this discus-

such as carbon pricing will be insufficient to ensure speedy decarbonisation. The use of industrial policy in the service of national interest may lead to an international subsidy race, to the detriment of developing countries. Moreover, policymakers need to be aware of the negative effects of industrial policy on innovation, particularly at the technological frontier. Protectionist approaches might slow technological innovation in a time when speed is of the essence.

Chapter 7, *Industrial Policy and the Green Transition* (Chiara Criscuolo, Antoine Dechezleprêtre and Guy Lalanne), postulates that green industrial policy should go beyond carbon pricing and should leverage the complementarities of supply- and demand-side instruments. The current pace of innovation is too slow to face the challenge of climate change; a range of barriers and market failures remain at the root of the problem. To resolve these, a mission-oriented industrial strategy for the green transition is needed. The authors suggest a taxonomy of industrial policy instruments to deploy in concert. Effective green industrial policy should make strategic use of different policy instruments supporting innovation and technology adoption, carbon pricing and framework instruments (such as standards and regulations and policies to encourage skills). Industrial policies are not necessarily incompatible with competition and should be designed so that they do not slow down structural change and business dynamics.

Chapter 8, *Industrial Policy and the Green Transition in the Global South* (Ricardo Hausmann and Ketan Ahuja), further enlarges the scope of the discussion by providing a Global South perspective on Europe's green industrial policy, illustrating how a more global European industrial policy would be better suited to deal with the trade-offs the continent faces. The authors argue that Europe should not pursue a 'Europe first' approach, but should only engage in strategic competition over the parts of the value chain in which Europe holds a comparative advantage. Bottom-up techno-economic cost modelling and economic-complexity analysis of emerging clean supply chains can help identify these parts. EU green industrial policy should also recognise

comparative advantages at a regional level. Policymakers can map desirable green technological capacities against existing regional capabilities, and thus increase the likelihood that a region will respond successfully to green industrial policy.

Chapter 11, *International Climate Cooperation in a Post-COVID World* (Chad Bown), examines how the Inflation Reduction Act (IRA) of 2022, its implementing regulations, policy decisions on leasing and potential critical minerals agreements all have the potential to affect the electric vehicle supply chain. This case study showcases the political-economic complications involved in US and EU attempts to cooperate over clean energy transition policy to address the global externality of carbon dioxide emissions. Electric vehicles are one example of the challenge facing partners with integrated supply chains and similar levels of economic development that share concerns about climate change, rising inequality, workers, other social issues and democracy itself. The author argues that the electric vehicles conflict laid bare the differing US and EU prioritisation of these issues relative to economic efficiency, World Trade Organisation rules, the approach to non-market economies and national security vulnerabilities.

Chapter 12, *Developing a European Strategy for Innovation: COVID-19* (Mathias Dewatripont), focuses on the innovation part of industrial policy by bringing into the analysis Europe's experience with COVID-19 vaccines. While Europe has a solid foundation in the health sector, it suffers from suboptimal coordination between parties, especially between providers of funding. The author argues that the EU should put in place a renewed support strategy for the development and commercialisation of innovative technologies modelled on DARPA. This approach would enhance competition, mix top-down and bottom-up approaches, and support innovation while prioritising affordability. Industrial policy should also aim at improving bargaining positions through EU-wide coordination of negotiations with pharma companies, to limit their ability to play countries off against

Veugelers, R. (ed) (2013) *Manufacturing in Europe's Future*, Blueprint Series Volume XXI, Bruegel, available at <https://www.bruegel.org/book/manufacturing-europes-future>

Von der Leyen, U. (2023) 'Speech on EU-China relations to the Mercator Institute for China Studies and the European Policy Centre', 30 March, available at https://ec.europa.eu/commission/presscorner/detail/en/speech_23_2063