1. Introduction to *EU Industrial Policy in the Multipolar Economy*: past lessons, current challenges and future scenarios

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In this introductory chapter, we explore the recent developments and drivers towards a new industrial policy for the European Union (EU or Union) in order to better situate the more specific chapters in this volume. We first point to the progressive re-emergence of industrial policy at the forefront of the EU's agenda in the past two decades, culminating in the Von der Leyen Commission's quest for open strategic autonomy. Secondly, the very concept of industrial policy will be revisited, including rationales and theoretical and historical arguments. We then survey the various industrial policy tools, from classic horizontal to vertical and specific. Industrial policy at the EU level poses significant challenges for a variety of reasons. These include the reluctance of Member States to transfer industrial policy tools to a supranational level, but also the absence of an *esprit de corps* among industrialists in light of the rivalries between national business elites, the lack of centralized power over the internal market and Europe's technological dependence on the US. Finally, we outline three possible scenarios for the future of EU industrial and technological policy.

THE RETURN OF INDUSTRIAL POLICY TO THE FOREFRONT OF THE EU'S AGENDA

The 1980s and 1990s: Promotion of Horizontal Industrial Policy and Strengthening of Competition Law

Industrial policy in the EU as well as in other advanced economies, such as the US and Japan, has recently returned to the forefront of the policy agenda after decades during which the dominant economic discourse had considered

the term obsolete. Since the 1980s, the vision of a developmental state picking and nurturing winners to generate European champions – a vision inspired by strategic documents such as the 1970 Colonna Plan – gradually withered away and self-regulating market theories came to dominate economic thinking. EU policies became increasingly neoliberal, focused on the development of competitive markets and scaled down government intervention in the economy. Interventions of a vertical nature, such as those traditionally done in the steel sector, were reduced in favour of building a horizontal industrial policy.[1] Furthermore, in the early 1990s, some of the flagship projects of EU industrial policy were harshly criticized, notably Eureka's high-definition television standard programme (Gillingham 2003). The neoliberal approach, based on the development of a stronger competition policy,[2] deregulation and trade liberalization, was personified by Sir Leon Brittan (from the British Conservative Party) as Commissioner for Competition and Trade, and by Martin Bangemann (from the German Liberal Party) as Commissioner for Industry and Internal Market.

In the early 2000s, concerns were raised by the Commission and influential European economists on the sustainability of the EU's social and economic model. Firstly, the ageing population in Europe meant a higher dependency ratio, increasing the strain on welfare systems of Member States. Improving productivity and labour participation was considered a priority to preserve European social systems. Secondly, economists highlighted the rise of the technological gap with the US economy in key new technologies such as ICT, biotechnologies and nanotechnologies. Throughout the 1980s and 1990s, the main EU priorities had been to accelerate economic integration with the reduction of technical barriers to intra-EU trade through the harmonization and mutual recognition of technical and safety standards; the launching of the European Monetary System in 1979 that would lead to the introduction of the Euro in 1999; the establishment of the internal market in 1993; and the strengthening of competition policy with the aim of eliminating intra-EU distortions of competition. By 2000, EU officials and economists realized that despite having achieved these deeper integration goals, the technological and productivity gap with the US was swiftly widening. Such concerns were articulated in the famous Sapir Report to European Commission President Romano Prodi (Sapir et al. 2004).

This analysis was flawed in part by an overestimation of the US's economic performance in terms of growth. Many in the US and EU failed to notice that the higher growth of the US economy since the late 1990s was not only a result

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1 See Chapters 5 and 9 of this volume.

2 On competition law and policy in relation to industrial policy, see Chapter 3 of this volume.

of ICT productivity gains and a stronger participation rate in the labour market, but also speculative bubbles. The dotcom and subprime loans bubbles had been fuelled by a global liquidity glut attracted to the US economy through securitization and financial innovations in the US financial market (CDS & CDO)[3] (Aglietta 2009). Nevertheless, the increasing digitalization of the economy, the rise of US Big Tech (GAFAM) and the rise of technological content in services and manufacturing were sources of concern in Brussels and other European capitals, who feared that Europe would be left behind by the next technological industrial revolution (Defraigne and Nouveau 2022).

The 2000s: Non-Binding Horizontal Industrial Policies

These developments led to the adoption of the Lisbon Strategy (or Lisbon Agenda) and Europe 2020 programmes that inspired EU industrial policies in the 2000s and early 2010s. The purpose was to enable the Union to develop into a *knowledge-based society* capable of constant adaptation to ICT changes and to preserve its welfare systems. These two strategies are clear examples of a horizontal approach to industrial policy. They aimed at improving competitiveness across EU industries by increasing R&D spending and providing life-long training, so that the European labour force could acquire the skills of the "sunrise industries", i.e., the new industries in which the domestic economy benefits from an economic advantage. The targets of these programmes were indicative (not legally binding) and the EU had no authority vis-à-vis Member States to implement the various elements of the programmes – quite unlike the Maastricht criteria for monetary integration or the establishment of the internal market in 1993. As early as 2004, the Kok Report questioned the efficiency of the Lisbon Strategy due to the multitude of targets, their non-binding nature and the lack of enforcement methods (European Commission 2004).

In the aftermath of the 2008 global financial crisis, concerns over the prospects of the European economy grew considerably within the EU institutions and Member States. Various indicators indicated that the technological gap with the US was widening and that emerging economies from Asia were catching up and challenging European businesses in some of their traditionally strong sectors. Furthermore, many Member States faced investment shortages after the crisis. In this new context, former Commissioner Mario Monti produced the *Report on the Future of the Single Market* for Commission President José Manuel Barroso. Its tone contrasted with the approach taken since 1990, as Monti openly advocated for a more assertive industrial policy (Monti 2010).

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[3] I.e., credit default swaps and collateral debt obligations – two financial innovations that fostered shadow banking that led to the 2008 economic and financial crisis.

The 2010s: Rise of Chinese Industrial Giants and Dominance of US Big Tech

The 2010s were primarily characterized by the acceleration of the internationalization of Chinese business and the rise of China's Big Tech BATX.[4] There was a marked intensification of Chinese FDI inflows to Europe, involving several takeovers of important European companies such as the Volvo car division (sold by Ford), Italy's Pirelli, the Swiss agrochemical Syngenta and the German robotic firm Kuka. While some of these takeovers had financial purposes driven by Chinese domestic factors and did not raise major objections, others could be considered as strategic asset-seeking FDI that aimed at acquiring European technology to accelerate China's catching up.

While the opening of the Chinese economy was met with enthusiasm on the part of the EU at the time of the country's accession to the WTO in 2001 and the establishment of the EU-China strategic partnership in 2003, the Union progressively moved to a more defensive position. In the 1990s and 2000s, the EU was primarily concerned with securing intellectual property rights protection in China and wider access to the Chinese market for EU producers, as well as with dumping practices from Chinese light industries (i.e., textiles, shoes, toys, lighters, basic electronic products). However, after the internationalization of Chinese firms that started in the early 2000s and accelerated after 2008,[5] the Union's concerns became more focused on China's industrial policy fostering the international expansion of its national champions. In the 2010s, officials and business leaders from the most developed economies complained with increasing intensity that Chinese state support to its national champions was distorting competition in both the Chinese and international markets. The EU and US authorities realized that China was not progressively liberalizing its economy to adopt the Western capitalist economic model where the private sector and market forces dominate over state intervention, but rather was following its own original development model. The Chinese economy has developed as a mix between competitive market forces and a highly developmentalist state (Kroeber 2020; Dufour 2019). As such, a dynamic private sector has come to coexist with a dominant public sector in strategic industries (notably ICT, energy, agrotechnology, defence, infrastructure, finance) that are controlled by the Chinese Communist Party. Chinese leaders have been following a long-term strategy to catch up with the most advanced economies and compete with their businesses even in industries that had traditionally been the comparative advantage of Western economies, such as ICT, machine tools,

[4] Baidu, Alibaba, Tencent, Xiaomi.
[5] See Chapter 8 of this volume.

energy, cars, chemistry, utilities, financial services and transport. This evolution led to a reassessment of China by the EU, a pivotal moment of which was the labelling of China as a "systemic rival" in the EU-China Strategic Outlook released by the European Commission in March 2019:

> China is, simultaneously, in different policy areas, a cooperation partner with whom the EU has closely aligned objectives, a negotiating partner with whom the EU needs to find a balance of interests, an economic competitor in the pursuit of technological leadership, and a systemic rival promoting alternative models of governance. (European Commission 2019)

Given this evolution, some European industries and politicians favoured a more active role for the Union in order to ensure a level playing field, not only through its trade diplomacy but also through developing a more active industrial policy and transforming its approach to competition policy. This was particularly the case for the German government, which, supported by the influential Federation of German Industries (BDI), declared itself in 2019 to be in favour of further developing the EU's industrial policy to confront Chinese capitalism (BDI 2019; Federal Ministry for Economic Affairs and Energy, 2019). This marked a significant shift from the position the German government had held for several decades. The debate over the Siemens-Alstom merger in 2019 illustrated the change of approach of European governments. While EU competition authorities and Commissioner Margrethe Vestager (supported by railways companies from some EU Member States, such as the UK and Belgium) objected to it, strong voices were raised, notably in France and Germany, on the grounds that the merger of the German and French producers was necessary to compete against Chinese competitors in overseas markets. In 2020, German Chancellor Angela Merkel declared that it was necessary to "modernize European competition policy by accelerating the adaptation of State aid and competition rules", while the French Minister for the Economy and Finance Bruno Lemaire asserted that "adapting the competition rules was necessary to help European champions emerge" (Tamma 2020).

The continuous technological revolution generated by the digitalization of industry in the 2010s also highlighted the EU's dependence on Big Tech, primarily US and to a lesser extent Chinese. The progress in connectivity, the Internet of Things and artificial intelligence revealed how traditionally strong EU industrial sectors, such as the automotive industry,[6] household appliances, machine tools, finance and tourism, needed to cooperate with non-EU (mostly

[6] On the evolution of EU policy in the automobile sector, see Chapter 10 of this volume.

US) ICT firms in order to adapt to dramatic technological developments.[7] Issues including the control of data and the possible asymmetries between EU hardware (traditional manufacturing) and non-EU ICT services providers began to be raised among European industrialists. This was notably the case in Germany, France and Italy, which host manufacturing firms that are global competitors.

At the same time, the need to decarbonize European industries in line with international commitments to tackle global warming and other environmental challenges became increasingly pressing. The EU had first included an environmental pillar in the Lisbon Agenda at the European summit of Gothenburg in 2001, but it remained vague and non-binding. Europe 2020 set clearer goals – although still non-binding – with the 20-20-20 climate targets. After the 2008 financial crisis, several scholars and officials advocated for a New Green Deal, which in large part would comprise an industrial policy aimed at ensuring a transition towards more sustainable economic growth. The need to meet the objectives of the COP21 in Paris in 2015 accelerated the urgency of a green transition within European industries.

Against this background, the Juncker Commission (2014–19) put in place various horizontal initiatives to increase EU investment in digital technologies, as well as a series of actions to develop a low-carbon and circular economy (European Commission 2017). Firstly, the Commission launched a strategy to develop the Digital Single Market, comprising initiatives such as the development of cloud computing, standards in the ICT field and the Internet of Things (European Commission 2016). Next, funding was provided in key digital technologies to public authorities and businesses for the digital and ecological transition, for instance through the European Fund for Strategic Investments and Horizon 2020. Finally, the Commission adopted initiatives to support the circular economy in each step of the value chain[8] and a sustainable finance action plan to help promote environmental and social goals in financing.

The Juncker Commission also began promoting "industrial alliances" between the public and private sectors to achieve the development of strategic supply chains, such as the production of batteries, and developed a more aggressive competition policy in relation to US high-tech giants Amazon, Apple, Facebook, Google and Microsoft, forcing them to pay hefty fines or compensation.[9]

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[7] See Chapter 11 of this volume.

[8] See for example COM(2015) 614 final, Closing the loop. An EU action plan for the Circular Economy; COM(2018) 28 final, A European Strategy for Plastics in a Circular Economy.

[9] On EU competition law and policy, see Chapter 3 of this volume.

The Von der Leyen Commission: Affirming the Objective of Resilient, Digital and Sustainable European Industries through Common or Coordinated EU Policies

The Von der Leyen Commission, which took office on 1 December 2019, strengthened EU action to promote the digital and ecological transition of the European economy. The intensification of the China-US tech war, the growing influence of foreign tech companies, and the Union's lagging behind in the digital sector, as well as the development of breakthrough technologies, increased the urgency for the EU to develop more assertive action in the digital sector. Consequently, the von der Leyen Commission has made the development of standards and digital technologies a priority (Von der Leyen 2019a). Many initiatives have been proposed since 2020, including the acceleration of investments in Europe's Gigabit connectivity, the building of digital capacities and the regulation of AI, the control of data and the strengthening of cybersecurity (European Commission 2020a).

On the other hand, the acceleration of climate change prompted the Commission to propose a European Green Deal in December 2019. This new growth strategy sets a carbon neutral target for the EU by 2050 and aims to fulfil the commitments on sustainable development laid down in the United Nations' 2030 Agenda (European Commission 2019; United Nations 2015). This plan forms part of an emerging global strategy to decarbonize the economies of the major industrial powers. Thus, in the US the Biden Administration developed a Climate Plan that includes a $2tn investment in clean energy to create carbon-free electricity by 2035 and net-zero greenhouse gas emissions across the economy by 2050. Since 2020, Japan has been implementing its "green growth strategy" with targets of net-zero greenhouse gas emissions by 2050 and tripling the share of renewable power generation to at least 50 per cent (Nikkei 2020). The same year, China set the target of becoming carbon-neutral by 2060 (Holzman and Grünberg 2021).

The European Green Deal is not only a strategy designed to reach climate neutrality for the EU by 2050, but also encompasses a traditional industrial policy to foster the technological upgrading of the Union's industries and provide them with the capacity to gain market share in high value-added markets. It comprises measures to achieve a substantial reduction of carbon emissions, which will have a deep impact on all sectors of the EU economy (Sustainable Development Solutions Network and Institute for European Environmental Policy 2020) and important repercussions on international trade. The Commission's climate policy package proposed on 14 July 2021, Fit for 55, includes various proposals. Some of these aim at increasing the cost of energy-intensive production schemes through tax and price-mechanisms, such as the application of the EU emissions trading system (ETS) to new sectors,

a revision of the Energy Taxation Directive and a carbon border adjustment mechanism (CBAM). The latter will involve a carbon price on a number of energy-intensive goods including steel, iron, aluminium, cement, fertilizers and electricity imported from countries with no similar carbon pricing policies as the EU in order to avoid carbon leakage.

These elements indicate that behind the Green Deal lies a traditional industrial policy that uses technical barriers to trade and subsidies to upgrade the technological capabilities of the Union's industries and to shape global production standards. Should CBAM be adopted, it would affect important producers from emerging economies, notably the BRICS and Turkey – for example, a KPMG study estimates that the cost of CBAM for Russian exporters to the EU lies somewhere between $3 and 7.5 billion between 2022 and 2030 (Astrasheuskaya and Khan 2021). Some governments are already accusing the EU of strategically using environmental standards to distort international competition. The Commission pledged again in 2021 that the Green Deal schemes will be WTO-compatible. Nevertheless, some EU trade partners remain sceptical (Clark 2021).

Other proposals are of a regulatory nature: increased use of renewable energy, greater energy efficiency, stricter emission reduction targets (for the sectors not covered under the EU ETS, such as buildings, road and domestic maritime transport, agriculture, waste and small industries), better land use, a faster roll-out of low emission transport modes, and renewed infrastructure (European Commission 2021a).

In this context, the Commission has put forward a revision of the Energy Taxation Directive, which aims at aligning tax policy with the EU's energy and climate policies: promoting clean technologies, and removing exemptions and reduced tax rates on fossil fuels. So far, however, the EU has been unable to reform the framework of energy taxation in order to make it consistent with its environmental policies and objectives (Pirlot 2020).

The new financial resources specifically allocated to the Green Deal constitute a significant increase compared to the EU's traditional budget, even though most of the funds already existed in previous schemes and were simply relabelled (Stöllinger and Landesmann 2020; Tielemans 2021). The funds should help to make the necessary investments to reduce carbon emissions and to cushion the social impact of the energy transition for both obsolete polluting industries and the poorest households. With these measures, the Commission seeks to achieve what it calls a "socially fair transition", by shielding vulnerable groups from the potential negative economic effects of the green transition. It proposes to do so through compensatory measures, such as earmarking the revenue generated through the EU ETS for climate and energy-related projects, organizing revenue transfer at the Member State level to vulnerable households, micro-enterprises and transport users, and establishing a new

social climate fund. However, some analysts take the view that social transfers and subsidies will not be sufficient to cover the transition costs. Indeed there is strong opposition from populations, national producers' lobbies and national politicians that could hamper the implementation of the Green Deal (Tagliapietra 2021; Weale 2021; Khan and Fleming 2021).

The industrial policy aspects of the Green Deal are likely to widen the technological gap within the EU. Indeed, Member States from the periphery are likely to carry a proportionately greater burden of the adjustment than the most technologically advanced Member States. Furthermore, the Union's high-tech companies, which mostly originate from the highly developed economies of the north-western Member States (i.e., Germany, Scandinavia, the Benelux and France), are likely to gain market share at the expense of competitors from the southern and eastern periphery of the EU. In some aspects, the Green Deal replicates policies already pursued by Member States that are more proactive in environmental policies, such as Germany and Denmark (Khan 2021).

As with the Lisbon Strategy and Europe 2020, the Commission has set very ambitious goals in the Green Deal. However, it lacks strong supranational tools to compel Member States to comply with the targets. Several governments (France, Italy, Spain, Poland, Hungary, Latvia, Ireland and Bulgaria), as well as MEPs, have already expressed reservations regarding the social impact of Fit for 55, while seven of the 26 Commissioners have expressed their opposition to the project (Weise et al. 2021; Tagliapietra 2021; Khan 2021). Compared to the Lisbon Strategy and Europe 2020, the Green Deal and Fit for 55 have met with stronger resistance from several industries, notably air transport, the automotive industry and most heavy industries, which demand more subsidies (FT Reporters 2021; Kurmayer 2021). The capacity of the Commission and other EU institutions to overcome powerful industry lobbies has proven to be limited in the past (Laurens 2015; Defraigne and Nouveau 2022). All of these factors have given rise to serious scepticism regarding the EU's ability to meet the Green Deal's 2030 and 2050 environmental targets. Much more radical changes are likely to be necessary to achieve climate neutrality by 2050.

Another of the Von der Leyen Commission's priorities is to strengthen the EU's industrial and strategic autonomy. The 2016 Global Strategy proposed by High Representative Federica Mogherini had already called on the Union to foster its strategic autonomy in the fields of security and defence in light of the increase in external challenges (European External Action Service 2016). With the 2019 EU-China Strategic Outlook, this policy was extended to other strategic value chains in response to increased competition from China (European Commission and High Representative of the Union for Foreign Affairs and Security Policy, 2019). Commission President Ursula von der Leyen has put this objective at the heart of the Commission's action by pledging to lead a "geopolitical Commission" (Von der Leyen 2019b). From the point of view

of industrial policy, this ambition of building strategic autonomy means the reduction of dependence on third countries for critical materials and the development of industrial capabilities in both strategic sectors and breakthrough technologies (European Commission 2020b).

To meet these challenges, the Von der Leyen Commission has adopted a more proactive and prominent approach to industrial policy. The aim is to enable industries to make the ecological and digital transition through increased cooperation with all actors of the "industrial ecosystems",[10] to promote European industrial autonomy in critical supply chains, energy sources and technologies, and to develop new competition and trade policy tools in order to reach these objectives. One of the tools used in this respect is the more intense promotion of industrial alliances and Important Projects of Common European Interest (IPCEI). Industrial alliances allow for the acceleration of activities and aim to help private investors to discuss new business partnerships and models. IPCEI rely on Article 107(3)(b) TFEU, which allows Member States to grant State aid in favour of large transnational projects of strategic importance.[11] Concretely, the mechanism of industrial alliances has been used by the Von der Leyen Commission for the creation of capacities in the hydrogen, raw materials and space launchers sectors, as well as to produce industrial processors and industrial cloud technologies. New funds have also been provided to companies to reach the objectives of digital transformation, ecological transition and strategic autonomy, such as the 5G Infrastructure Public Private Partnership (G5 PPP), initiatives under the Equity Instrument of the European Fund For Strategic Investments (EFSI or "Juncker Plan") and its Early Stage Window, InnovFin Equity, to further support innovations in the fields of artificial intelligence, blockchain, space technology, impact investing and blue economy, the NextGenerationEU economy recovery plan, and the Steel Clean Partnership (SCP).

New competition rules constitute a key instrument to implement the EU's industrial strategy objectives. They aim to respond to the demands of some Member States for a competition policy that is less focused on lowering prices for consumers than on supporting industrial policy objectives. The EU's com-

[10] According to Commissioner for Industry Thierry Breton, an industrial ecosystem brings together at a European level all the players in the same sector in the broadest sense: large groups, SMEs and start-ups, training and research centres, services associated with and research centres, services associated with suppliers, but also public authorities, regions and local authorities (Breton 2020).

[11] The Communication concerning the compatibility with the internal market of State aid to promote the execution of important projects of common European interest (European Commission 2014) extended the provisions on IPCEI to any sector of the economy, increased aid intensity, and made it easier to support them.

petition law reform focuses on four areas: State aid, merger control, antitrust and the regulation of activities of the digital sector.[12]

As far as State aid control is concerned, the following measures are significant. Firstly, the Commission published new guidelines to facilitate the granting of subsidies for the ecological and digital transition of companies. These cover regional aid which supports the ecological and digital transformation of disadvantaged areas (European Commission 2021b) and subsidies which pursue general energy and environment goals (European Commission 2021c). The second proposal for reform of State aid law concerns the rules for the granting of subsidies to important projects of common European interest (IPCEI) (European Commission 2021d). Finally, in May 2021 the Commission proposed a regulation to investigate foreign subsidies which distort the internal market (European Commission 2021e).

In the area of merger control, in March 2021 the Commission announced a major reform of its procedures. The most significant change is that Member States will be encouraged to refer transactions not meeting the thresholds of the EU Merger Control Regulation to the Commission without the parties' consent (European Commission 2021f).

With regard to horizontal agreements between undertakings, the Commission plans to accept those helping to achieve the green and digital transition, such as research and development agreements, and to provide guidance on so-called "sustainability agreements" and procompetitive data-sharing and data-pooling agreements. Moreover, work is being done in 2021 to review the Vertical Block Exemption Regulation and the Vertical Guidelines, as well as the Market Definition Notice.

Finally, the Commission has fixed new rules for data regulation and control of the activities of digital companies. The Digital Services Act seeks to reinforce control over platforms' content policies (European Commission 2020d), while the Digital Markets Act entails new rules to promote competition in the sector and prevent large digital companies from abusing their market power (European Commission 2020e).

The Covid-19 Crisis and the Quest for Open Strategic Autonomy

The eruption of the Covid-19 pandemic in March 2020 increased the awareness of technological dependency in the EU. Global supply chains were disrupted by the national lockdowns and the EU was hit by shortages of key components in health-related industries, but also in other strategic sectors, including

[12] On EU competition law and policy, see Chapter 3 of this volume.

the automotive industry.[13] European Commissioners began to discuss the reshoring of some of these industries and the "shortening" of international production networks, as well as the diversification of domestic and external sources of supply and build-up of strategic production capacities and reserves. This approach is part of a new Commission strategy labelled "open strategic autonomy".[14] In addition, the Covid-19 pandemic showed the vulnerabilities of the internal market with disruptions in the free movement of goods, people and services due to national health measures.

In order to draw lessons from the crisis, the Commission formulated new political orientations as part of an update of its 2020 industrial strategy. Firstly, this includes a proposal to set up a Single Market Emergency Instrument to ensure the functioning of the single market in future crises. Its aim is to guarantee more information-sharing between Member States about any crisis-related measures adopted. The Instrument would also include a mechanism to speed up product availability through standard-setting and sharing, fast-track conformity assessments, and reinforcing public procurement cooperation in cases of critical product shortages. Secondly, the Commission proposes to enhance technological and industrial autonomy with initiatives such as the establishment of Common European data spaces, and new alliances for processors and semiconductor technologies, industrial data for edge and cloud computing, zero emission aviation and space launchers (European Commission 2021g). In addition, synergies between civil, defence and space industries are promoted in order to enhance their complementarity at the level of programmes, innovation and start-ups (European Commission 2021h). Finally, the Commission supports increased collaboration in several sectors, notably in the pharmaceutical industry in order to expand the production of vaccines against Covid-19 (European Commission 2021i), as well as in the semiconductor industry. In the latter sector, the Commission plans to adopt a European Chips Act which aims to enhance European research, production capacity and security of the supply of chips. This initiative is a response to recent measures taken by China and the US to increase the resilience of their semiconductor supply chains (Breton 2021; Von der Leyen 2021).

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[13] On EU policy with regard to the automotive industry, see Chapter 10 of this volume.

[14] The term "open" was added to "strategic autonomy" following the demands of some Member States to emphasize that this new orientation had to be achieved while preserving an open economy. "Open strategic autonomy" in the industrial sector is defined as the "need to produce critical goods in Europe, to invest in strategic value chains and to reduce overdependency on third countries" (European Commission 2020c).

EU trade policy has also been reformed to achieve the green and digital transition of industry, as well as the objectives of open strategic autonomy, i.e., the diversification of domestic and external sources of supply and the build-up of strategic production and reserves (European Commission 2021j). As in the past, the Commission privileges a multilateral approach: firstly, through the WTO in order to create global rules for digital trade, the fight against unfair practices, and public procurement, as well as to open up new markets for the diversification of supply; secondly, via other multilateral organizations in order to develop cooperative frameworks for fair and equitable access to critical supplies and rules for the global ecological transition. Thirdly, the Commission is also set to continue negotiating sustainable development standards and provisions to fight against unfair practices in bilateral trade agreements. Finally, the Commission proposes to explore options for an EU strategy for export credits in order to incentivize climate-friendly technology projects abroad and end the subsidization of fossil-based projects in third countries.

THE RATIONALE FOR INDUSTRIAL POLICY

The EU's goal of strategic autonomy prompts the question as to whether, and to what extent, the Union will develop new specific industrial policies and tools. This calls for an understanding of the rationale and constitutive elements of an industrial policy.

Definition of "Industrial Policy"

Industrial policy can be defined as state measures (subsidies, taxation, regulation of goods, services and factors of production) that modify the allocation of economic resources resulting from free market competition and that aim to strengthen national growth and competitiveness (Gual 1995). Paul Krugman, among others, has seriously questioned the notion of competitiveness, which is difficult to quantify. If, for example, the success of industrial policy is ascertained by treating a rising trade surplus as a sign of improved competitiveness, a change in monetary policy that leads to a depreciation of the national currency could qualify as an efficient industrial policy, while in reality, the methods of production and the qualification of the labour force have been unchanged. On the other hand, if two countries were to simultaneously develop R&D programmes that enhance the productivity of their respective national industries with a comparable impact, their competitiveness vis-à-vis each other would not be modified.

To consider competitiveness as the goal of industrial policy implies that international trade be viewed as a zero-sum game between competing nations. This is an implicit and potentially dangerous mercantilist approach to global economic governance. In the present volume, we adopt the view that an effi-

cient industrial policy should seek to maximize long-term productivity gains combined with environmental and social sustainability.

While industrial policy originally targeted the manufacturing sectors of a domestic economy, since the end of the twentieth century it has been refocused to include the rising development of knowledge-based industries and services in the global economy.

Scholars and officials traditionally distinguish two types of industrial policies: horizontal and vertical. A horizontal industrial policy consists of instruments that impact the various domestic industries across the board, while a vertical policy will focus on a specific industry or even a specific firm that is perceived by the government as strategic for national sovereignty.

Theoretical Arguments for an Industrial Policy

Learning-by-doing and the Listian argument of infant industry

The oldest and most influential argument in favour of industrial policy is about the necessity of protecting a national industry in its infancy stage. The argument was first developed by German economist Friedrich List who rejected the British political economy theory advocating for free trade because German national industry could not withstand British competition in its infant stage. For List, the support and the protection of the state should be provided on two conditions. Firstly, a national infant industry should already exist in the country, and secondly, no state support should be given if the infant industry is a monopoly as this would produce a pure rent-seeker situation (List 1998 [1844]). The dominant current in economics rejected List's approach for decades and stuck to the Ricardian comparative advantages analysis and various frameworks developed from it, notably the Heckcher-Olin-Samuelson (HOS) theories that dominated the analysis of international trade until the 1970s. These were based on the assumption of perfect competition and a very static view of technology (De Meulemeester and Defraigne 2009). HOS theories reject the possibilities of technological path dependencies and learning-by-doing, as well as economies of scale. They also assume that factors of production cannot move internationally. As such, these abstract HOS models of the twentieth century could not explain the globalization of production processes and the functioning of multinational enterprises (MNEs). Neither could they explain why the bulk of world trade was taking place between countries with similar Ricardian advantages (the US, Europe and Japan), nor why the East Asian countries that did not follow their comparative advantages performed better than others which did. It was only in the mid-1970s that economic theory began to develop more realistic international economics models that took into account widely observed real economy phenomena, such as imperfect competition, economies of scale and learning-by-doing.

Strategic trade policy

Paul Krugman, James Brander and Barbara Spencer developed List's argument more rigorously, justifying government intervention in the form of protectionism or subsidies under specific conditions, which they described as strategic trade policy. Under these models, industrial policy is justified from a national, or even a global, welfare perspective if the industry concerned is controlled by a foreign monopolist or characterized by important network economies or learning-by-doing effects (Krugman 1993).

In the case of the foreign monopolist, it can capture rents from consumers in the national economy. The national authorities can decide to nurture a national champion that is able to compete against the foreign monopoly to avoid this international transfer of rents, thereby increasing the economic welfare of the national economy.

Learning-by-doing and network economies occur when cumulated production provides network economies and/or experience that lower the production costs of the firm. In this case, the prime mover firm from a given country can quickly build a position as an entrenched incumbent firm benefiting from intangible assets that provide a cost advantage that deters potential entrants from the rest of the world (e.g., the US aerospace firm Boeing). This situation could also justify the support for a national infant industry to enable catch-up, leading to competition that increases national, or possibly global, welfare, as consumers from the rest of the world benefit from lower prices (e.g., subsidizing Airbus to compete against Boeing) (Krugman 1993).

Marshallian districts

Another important economic concept that justified state intervention was the existence of Marshallian districts. Alfred Marshall developed a theory at the beginning of the twentieth century to explain geographical business clusters in specific industries. According to this theory, external economies of scale[15] occur because of several effects linked to the geographical clustering of firms operating in the same industry. The industrial agglomeration attracts a pool of qualified labour from the rest of the world, engendering a specialization of local schools and universities in the technical fields related to this industry. This phenomenon generates useful informal transfers of information in terms of best practice and complementarity in innovation, as well as experience for

[15] Internal economies of scale occur when the firm lowers its average production costs by increasing its volume of production (e.g., the large-scale standardized production system adopted by Ford in the early twentieth century). External economies of scale occur at the level of an industry, not only the firm, whereby the joint production volume of a given business cluster generates a fall in the average costs of all firms located in the cluster (e.g., Silicon Valley).

the local authorities enabling them to provide an adequate supply of public goods for the specific industry (infrastructure, institutions, guidance). Finally, economies of scale for suppliers and transport companies reduce the price of the deliveries of specific inputs (Krugman and Obsfeld 2009; Dicken 2015). These benefits accrue to all enterprises located in the Marshallian district regardless of their individual level of output. External economies of scale occur because of the total output produced by all of the firms located in the Marshallian district. Silicon Valley in California provides a classic illustration. Marshallian districts in high value-added industries contribute to increasing the productivity, the export capacities and more sustainable growth for the countries that host them. Industrial policy can support the development of a specific industry in a geographically defined area that can foster industrial agglomeration and external economies of scale so as to create or strengthen a Marshallian district in a national economy.

Historical Arguments

Until the late twentieth century, empirical analysis often contradicted the economic theory based on the free-trade Ricardian approach. Already in the 1950s, empirical data collected by Wassily Leontieff questioned the validity of the Ricardian and HOS frameworks (Rainelli 1995). Economic history has highlighted the use of industrial policy tools by states to catch up technologically with the most developed economies and increase national productivity. To develop proto-industries in their territory, English governments from the Tudors to Oliver Cromwell developed various tools such as export restrictions of raw materials (to induce domestic transformation of inputs), technical barriers to trade (Cromwell's famous Navigation Acts against the Netherlands), quotas (against Indian textiles in the eighteenth century) and incentive schemes to attract a qualified labour force from continental Europe (Adda 2012; Parthasarathi 2011. Similar policies were adopted in the late eighteenth and nineteenth centuries by governments in the United States, across continental Europe and in Japan seeking to catch up technologically with the British economy (Chernow 2004; Defraigne 2016). After the Second World War and the decolonization process, various newly independent countries adopted industrial policies to strengthen their national technological and industrial base, such as China, India, South Korea and Iran (Wade 2004; Jaffrelot 2006; Lemoine 2007). While industrial policies enforced over the past two centuries often had disastrous effects,[16] in several other cases, they enabled changing the

[16] For example, Mao's drive for accelerated industrialization during the Great Leap Forward or white elephant projects in some developing countries which led to uncon-

traditional role of the national economy in the international division of labour in a way that dramatically increased domestic growth and improved standards of living (Defraigne 2016; Chang 2007).

THE TOOLS OF INDUSTRIAL POLICY

Horizontal Industrial Policy Tools

The purpose of horizontal industrial policy tools is to enhance the growth potential of all the sectors of the domestic economy. This section provides classic examples of such tools.

Funding infrastructure
The state can fund and upgrade the infrastructure necessary to provide firms with efficient utilities and transport networks, in addition to well-connected industrial parks.

Funding education and research
The state can provide an adequate education system that enables the development of the necessary skilled labour force for domestic firms or foreign investors.

The state can decide to develop domestic R&D capacities by funding universities and research centres that can cooperate with business enterprises. It can fund fundamental research that could result in the technological standards of the future.

Providing domestic labour markets with faster capacity to react to international technological change that modifies traditional comparative advantages
The global economy is characterized by continuous changes as some advanced economies have developed new industries (e.g., US ICT and nanotechnologies), while several emerging economies have improved their domestic manufacturing sectors, their innovation capacities or other intangible assets (Chinese 5G equipment, South Korean smartphones, Ethiopian garments). This shifts the traditional comparative advantages of countries and transforms the international division of labour in the global economy. What were once traditionally competitive domestic industries can suddenly decline and become sunset industries as more competitive new producers emerge from the rest of the world. This phenomenon can lead to massive unemployment with

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trolled indebtedness and embezzlement of state assets.

long-term socio-economic consequences for entire regions of the domestic economy that hosted these industries. Hainaut, Nord-Pas de Calais, Lorraine, Northern Ireland, and Wales, for example, were hit by the decline of textiles, steel, coal and shipbuilding industries in the 1970s and 1980s that had long-term consequences for their growth potential.

To smooth the domestic economy's adaptation to changing international comparative advantages, governments can design training and employment mobility policies to facilitate the shift of the labour force from sunset to sunrise industries.

Providing an efficient institutional environment

Some specific institutional innovations or best practices in terms of economic governance can generate business productivity gains by lowering transaction costs. If the state provides adequate protection of intellectual property rights, sets up a fair, swift and transparent litigation system for business enterprises and professionals, and limits red tape and corruption for the establishment of new production units, it will increase the growth potential of its national economy.

Taxation policy

Taxation policy is a very important and frequently used tool in industrial policy, from both a domestic and international perspective (Devereux et al. 2021). By levying taxes, whether on income, capital or consumption, governments may find the necessary financial resources to fund policies that will foster industrial development, in areas such as education and training, infrastructure and transport, or energy and environment (see above). Moreover, tax measures may also be used to steer the behaviour of economic actors. The structure of business taxation may impact the overall level of investment and distributed earnings. General reductions of the nominal rate of corporate tax, whether permanent or temporary (tax holidays), may serve as a flagship measure to attract foreign investment. More targeted tax breaks may induce companies to adopt specific industrial strategies designed to increase the growth prospects of the domestic economy. Classic examples include incentives relating to R&D, royalties or greening investment; additional taxes for polluting or energy-wasting producers; reduction of social security contributions and wage taxes for employers (Traversa 2014).

Naturally, governments must balance the trade-off between the loss of tax revenue incurred by some of these tax incentives for firms and the capacity of the state to make the necessary investments to maintain other necessary conditions for a performing national economy, such as a modern infrastructure and an educated labour force. Moreover, within the EU, the prohibition of State aid, the principle of non-discrimination and, to a lesser extent, harmonization measures may limit the room for manoeuvre of Member States when it comes to tax policy (Richelle et al. 2016).

Adopting a balanced competition policy

Part of ensuring productivity gains and sustainable growth is to avoid anti-competitive practices on the part of firms operating on the domestic market. Since the late nineteenth century, states have developed competition policies to avoid the risks of abuse of a dominant position by a monopolist, the retention of technology that slows down national productivity and the development of cartels that restrict output and push up prices.

Competition policy objectives can sometimes collide with industrial policy imperatives. Competition policy focuses on optimizing consumer welfare by preventing anticompetitive behaviour to enable an optimal allocation of resources (allocative efficiency). This can contradict the well-known Schumpeterian argument, which claims that the rent position of the monopolist stimulates innovation (Schumpeter 1942). A merger can facilitate a significant R&D endeavour necessary to develop new technologies that will drive production costs down, which may benefit consumers in the long term. This is likely to happen in production characterized by high fixed costs, important learning-by-doing and network economies effects. However, in other sectors, mergers may have the opposite effect, by creating players that are too dominant, creating barriers to newcomers and limiting innovation.

An approach to competition policy that is very rigid and based solely on securing a short-term optimization of allocative efficiency might prevent firms from reaching productive efficiency (i.e., operate at the minimum efficient scale, engage in R&D that reduce production cost to enjoy a monopoly position) that can benefit consumers in the long term (Huveneers 2008). This trade-off is extremely delicate as there are problems of asymmetry of information between competition authorities and producers, as well as uncertainty regarding the R&D capacity to produce results within a precise timeframe. National authorities have different approaches to dealing with this trade-off, as the contributions to this volume will demonstrate.[17]

Supporting international expansion

The state can use various tools to facilitate the international expansion of national firms and their transformation into MNEs. State agencies or ministries can provide guidance on international and overseas local trade and investment rules, as well as on cultural specificities of the various overseas regions. The Japanese External Trade Organization (JETRO) and Ministry of International Trade and Industry (MITI), for example, played a decisive role in the interna-

[17] On EU competition law and policy, see Chapter 3 of this volume, as well as the chapters devoted to specific industrial sectors.

tionalization of Japanese firms in Asia and Western economies in the 1970s and 1980s (Hatch and Yamamura 1997).

The state engages in economic diplomacy that can provide its national firms with preferential access to overseas markets in terms of trade and investment by developing bilateral and/or regional trade agreements. Economic diplomacy can also occasionally secure access to specific procurement projects launched by governments or trade partners. Tied aid programmes to developing countries, in which projects must involve firms from the donor country, have been a traditional tool of support to national industrial champions. Several cases have been observed from France in its former African colonies to the reconstruction of Iraq after 2003, or China's Belt and Road Initiative's recipient countries since 2014. The state can also facilitate the exports of its domestic firms by setting up state-owned export banks that provide export credits to countries importing goods from domestic firms.

Creating environmental standards to ensure sustainable growth

There is a global awareness among governments that greening industries will become increasingly imperative over the next decades. In this context, the most technologically advanced countries are competing to set new technological and regulatory standards that can contribute to lowering pollution and energy consumption, but also with the aim of gaining new markets. A state can promote the diffusion of its national standards so that they become international standards, giving an edge to its domestic firms already familiar with them. The Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) regulation of the EU constitutes an example of this. With REACH, the EU has created a stricter environmental standard for the chemical industries and uses its trade diplomacy to promote this standard so that EU firms will enjoy an advantage over less environment-friendly competing firms from outside the EU. Another example, discussed in 2021 at the EU level, is the Carbon Border Adjustment Mechanism (CBAM), a defensive measure aiming at reducing the risk of "carbon leakage", which could end up being a very efficient tool to incentivize EU trading partners to adopt carbon taxes or similar measures (such as emission trading systems).

Environmental standards and targets are likely to become increasingly important elements of industrial policy in the future, as they are both a necessity and a strategic tool to promote national firms in the global competition for greener technologies.

Vertical Industrial Policy Tools

Protectionist measures

A government has several tools at its disposal to protect a specific domestic industry or national champion from foreign competition. Tariffs and quotas have traditionally been used to protect infant or restructuring domestic industries.

A more subtle and less visible tool than tariffs or quotas are technical barriers to trade. States can develop specific technical, safety, environmental or labour norms and use them as barriers against foreign competition. In the common market of the 1960s, the French state could not use tariffs to protect its domestic producers of washing machines from Italian competition and so erected a barrier by enacting a new safety standard that Italian producers could not meet in the short term. States can also use red tape to delay imports. In some instances, firms seeking to export to a specific country have to submit to a certification process for new safety norms. When governments want to shield their domestic producers, the procedure can last months or years (Aujean et al. 1992). A notorious example of the strategic use of red tape was the blocking of Japanese videorecorders by the French government in 1982 by forcing Japanese imports to transit by a nine-person custom depot in the small town of Poitiers (Safire 1982).

Governments can also give preferential or exclusive access to state procurements. This tool is particularly used to protect domestic industries related to infrastructure, construction, transport, energy, health services, medical equipment, pharmaceuticals and defence (Defraigne 2004).

Subsidies

State aid is another traditional tool of industrial policy and can target specific industries or firms rather than business enterprises in general. Subsidies can support the building of infrastructure, R&D, exports, or can be linked to the level of output.[18]

Creating Marshallian districts

Using the various tools above, the state can try to develop a local regional business cluster capable of generating external economies of scale in a specific industry. A government can thus hope to foster the clustering of firms, domestic but also sometimes foreign, in a targeted industry. States have contributed to the development of Marshallian districts in several industries (Vandermotten and Marissal 2010; Dicken 2015). The most advanced econ-

[18] On State aid and industrial policy, see Chapter 2 of this volume.

omies attempt to focus on high-tech Marshallian districts that generate high value (ICT, renewable energies industries, pharmaceuticals, defence), while developing economies tend to develop low-tech Marshallian districts based on their traditional Ricardian comparative advantages (e.g., textiles, garments and leather in Bangladesh, Ethiopia and Vietnam). Marshallian districts facilitate the insertion of countries in the global value chains of MNEs. If a country hosts high-tech Marshallian districts, it will enable firms located in these clusters to control global value chains thanks to their capacity to innovate and create global technological standards.

Picking the champions

The state can pick specific domestic firms to transform them into national champions in an industry considered essential for national economic growth or national sovereignty. States can impose mergers of domestic firms to accelerate rationalization of production capacities and enable the national champions to benefit from economies of scale. The state can also build its own state-owned national champions from scratch. These types of top-down state intervention have seen limited results and there is no clear consensus among scholars on the efficiency of such vertical industrial policy. Looking at economic history, the level of success has varied across countries and time according to the level of economic development of the national economy, the level of corruption, transparency and stability of the national institutions, as well as exogeneous factors linked to the global economic environment.

Strategic and predatory industrial policies

States can also develop more directly aggressive beggar-thy-neighbour industrial policies that can lead to serious trade tensions. These policies are not common, but many states have used some or all of them at different times throughout the development of their national industries.

Several countries have engaged in industrial espionage during the early stage of their industrialization to acquire advanced foreign technology quickly. Some analysis suggests that even advanced economies continue to engage in industrial espionage (Dufour 2019).

A less aggressive policy is for national authorities to adopt a lenient attitude towards domestic violators of foreign intellectual property rights (IPRs). The expansion of the WTO has meant that its 164 Members have adopted the TRIPs Agreement, which requires the protection of IPRs. However, there is still room for manoeuvre by national authorities regarding the effective enforcement of such measures, enabling reluctant governments to adopt stalling and delaying tactics, as China has notably done (Hopewell 2020).

Dumping practices can be tolerated, encouraged or sometimes even subsidized and organized by the state. Prior to the First World War, for example,

the German state authorized national cartels that enabled German firms to subsidize their exports thanks to the price mark-up imposed on domestic consumers (Maschke 1969). As Chapter 8 of this volume will outline, China has been regularly accused by trading partners of organizing massive dumping of its manufactured products. Along the same lines is the practice of subsidizing exports. Subsidies for manufactured exports violate the provisions of Article XVI of the GATT. This legal constraint compels some states to disguise their export subsidies though various mechanisms such as tax breaks, subsidizing energy or other inputs used by domestic exporters, or providing capital access below market rates. WTO violations linked to dumping and subsidies account for almost 45 per cent of the cases brought to the WTO Dispute Settlement Body between 1995 and 2020 (WTO 2021). Undervaluing the domestic currency can also be a beggar-thy-neighbour policy to increase the competitiveness of national exports.[19]

States can adopt bullying trade policies in which they use non-trade geopolitical considerations to improve their bargaining position in trade negotiations with trade partners and to enable the international expansion of their national champions. Several international relations analysts have highlighted how big powers have used their geopolitical weight and security leverage to gain commercial advantages over smaller countries. The US administration employed such an approach with Germany and Japan during the Cold War (Panitch and Gindin 2013) and, more recently, under the Trump administration with Japan and South Korea where non-trade security aspects were included in bilateral trade negotiations.[20] Vladimir Putin's administration also plays on Russia's geopolitical leverage in trade negotiations with neighbours (Dragneva and Wolczuk 2013). The opaque relations between France and its former African colonies, dubbed Françafrique, reveal a similar phenomenon (Bat 2012; Verschaeve 2008). While, unlike other big powers, China has not yet played on its military leverage, Chinese officials engage with highly corrupt regimes to secure markets for their national champions (Economy 2018).

The common point between these beggar-thy-neighbour policies is that their zero-sum game perspective produces a climate of tensions and distrust that destabilizes global governance. Reprisals can get out of control, as the escalation of trade and geopolitical tensions in the 1900s and 1930s indicate. Increasingly, aggressive trade and industrial policies led first to a collapse of multilateralism and to local conflicts before turning into catastrophic global conflicts (James 2001; Benichi 2008).

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[19] On WTO law and industrial policy, see Chapter 4 of this volume.
[20] For examples, see Chapter 7 of this volume.

IMPLEMENTING INDUSTRIAL POLICY IN THE EU: INSTITUTIONAL AND POLITICAL CONSTRAINTS

Having outlined the main tools of industrial policy, we turn now to an exploration of how they are developed within the complex European framework. The EU, as is well known, represents a unique institutional and political architecture.

A Complex Division of Powers between the EU and Member States in the Area of Industrial Policy

European integration has meant the development of supranational institutions endowed with specific competences by the EU Member States in the EU Treaties. Thus, "industry" is mentioned as one of the competences of the EU in Article 6(b) of the Treaty on the Functioning of the European Union (TFEU). However, it is a "weak" competence, in the sense that it only serves to "carry out actions to support, coordinate or supplement the actions of the Member States". The sole provision on this topic in the Treaties, Article 173 TFEU, is most striking for the weak competences it confers upon the Union, which exclude any harmonization of national laws or tax measures. It makes abundantly clear that the EU institutions are not endowed with the strategic powers that national governments have. While some competences are shared between the national and the supranational levels of power, EU Member States maintain the lion's share of their powers in the fields of defence, foreign policy, tax, welfare, health and education.

This implies that the various traditional tools of industrial policy outlined earlier are at most shared between the EU and its Member States, a rather complex situation (Table 1.1).

Several scholars, notably those focusing on politics and public law, attribute the limited transfer of powers to the EU institutions primarily to the reluctance among Member States, as well as national public opinion and civil societies, to give up key elements of national sovereignty (Nugent 2010; Bulmer et al. 2011). Domestic businesses lobby national governments to defend their interests against foreign competitors, including those from the EU. This implies maintaining industrial policy tools at the national level. Despite EU powers in the area of customs union and State aid control, the use of subsidies and technical barriers to trade by Member States to protect their national industrial champions has constituted a major source of obstacles to European economic integration from the European Coal and Steel Community (ECSC) to the current consolidation of the single market.

Table 1.1 Tools of industrial policy at the EU and Member State level

	EU Level	Member State Level
Horizontal industrial policy		
Funding research and education	Less than 10% of R&D spending (mostly framework programmes)	90% of R&D spending
Access to credit and to capital markets and banking supervision	Banking Union (ECB supervision for systemic banks)	Domestic capital markets/ National supervision for non- systemic banks
Competition policy (including mergers and acquisitions)	Mostly EU competences (de minimis rule)*	For national firms (de minimis rule)
Subsidies	Some EU subsidies (European Investment Bank, structural funds)	Mostly national competences but under EU control
Funding infrastructure	Some EU funding (European Investment Bank [EIB], structural funds, Connecting Europe Facility)	Mostly national competences, bigger share of funding than the EU
Taxation	None so far (under discussion in the framework of NextGenerationEU Recovery Plan)	National competences but under EU control
Vertical industrial policy		
Common External Tariff	EU competence	None
Technical barriers to trade creation	Mostly EU competence	A few national technical barriers to trade in key sectors (energy, transport, defence, utilities)
Environmental standards creation	Mostly EU competence	A few national standards on safety grounds (e.g., ban on GMO seeds)
Marshallian districts creation	None	Mostly national competences
Picking champions	None	Mostly national competences (constrained by EU competition rules)

	EU Level	Member State Level
Bilateral trade diplomacy	Bilateral trade agreement negotiations	Bilateral economic missions involving top government figures (contracts negotiations)
Multilateral trade diplomacy	Multilateral trade negotiations (WTO)	None but many agreements submitted to ratification by Member States as well
Guidance to support the international expansion of firms	Some guidance to EU firms (Market Access Database, EU delegations)	Some guidance to national firms (Member State specific agencies and consulates)
Export credits	Limited EIB facility for buyer credit financing for European SME exporters	Member State buyer credit financing for their domestic exporters (mostly credits)
Tied-aid programme	No official tied aid programme	De facto tied aid programmes by some Member States with military and financial power (e.g., France in Françafrique)
Predatory industrial policy	None	Industrial espionage

Note: * In EU law, the de minimis rule stipulates that agreements of minor importance which do not appreciably restrict competition under Article 101(1) of the Treaty on the Functioning of the European Union do not fall under EU competence but under individual Member State competence.

This reluctance to transfer economic power to the EU level generates a double-layered industrial policy (EU and domestic), which may lead to inefficiencies due to overlaps and intra-European competition. Member States can compete on the creation of Marshallian districts in the same industries, preventing the Union from playing a coordinating role that could maximize their external economies of scale. The same phenomenon occurs in relation to specific project-based vertical industrial policies in strategic industries. The EU has seen the duplication of comparable projects and business clusters, leading to inefficiency in terms of economies of scale, learning-by-doing and network economies effects. Moreover, access to credit and to venture capital remains largely national. Such problems can be observed in key industries, including ICT, defence, finance, telecom, energy and transport (Defraigne and Nouveau 2022).

The case studies presented in this book – as well as the analysis of the industrial policies of the two global economic giants, the US and China – highlight the problems caused by the absence of a centralized authority in the EU, which precludes Member State economies from fully benefiting from economies of scale in some key industries.

Naturally, the existence of a centralized state apparatus controlling a large domestic market and benefiting from important financial resources is not a necessary prerequisite to develop successful industries in a given country. Examples, including Switzerland, South Korea, Taiwan and Singapore, have shown that small countries can produce globally competitive high-tech industries.[21]

Moreover, problems related to the degree of power centralization can occur in large economies (the US, China and Japan) that also face competing industrial policies pursued by their respective subnational entities (China's provinces for example) (Dufour 2019). However, the national level of power in the US, China and Japan has far more prerogatives and authority than the EU vis-à-vis its Member States. The central authorities can act as an arbitrator to keep rival subnational entities under control. They can set national standards

[21] However, small successful countries in terms of technological development and industrialization have remained highly dependent on larger economies and enjoy only a limited degree of technological autonomy. These small economies have developed successful niches in cooperation with larger economies. The East Asian Tigers have developed their economies since the 1950s under the strong geopolitical influence of the US, which controlled their international trade routes and provided financial and economic advice in the context of the Cold War (Defraigne 2016; Hamilton and Cheng-Shu 2017; Studwell 2013; Dieter 2006). Their national firms inserted themselves in international production networks set up by American MNEs (and later, other MNEs) (Defraigne 2016).

that favour some of their subnational entities (federated states in the US, provinces in China and prefectures in Japan) over others. States can use the national budget to discriminate and pick winners through the allocation of subsidies. They can also play with fiscal capacity (direct consequences of substantial autonomous taxing powers) to compensate losers by developing alternative projects (e.g., a major defence contract allocated by the US federal government to a federated state, or the Chinese central state funding the development of a Marshallian district specialized in photovoltaic energy in a less developed province that holds less high-tech clusters). This approach can be seen in the new programmes of the Biden administration voted on during the summer of 2021.[22]

With a budget capped at less than 1 per cent of the EU's GDP, and no power to levy its own taxes, EU institutions cannot offer a similar compensation system. This indicates that Member States and their respective national business communities might be wary of giving more powers to the EU related to industrial policy as they may not benefit from such policies or from compensating measures. For this reason, a national business community may prefer to lobby its own government to keep industrial policy tools and budget at the national level. In the case of a transfer of competence and budget at the EU level, they will lobby their government to make sure that there will be a *juste retour* (fair return) from EU projects to the national economy. The EU Framework Programmes for Research and Technological Development, for example, have been increased substantially since their creation in 1984. However, de facto, the allocation of funding and projects have most often followed the fair return principle (funds have been allocated proportionally to the financial contributions of Member States) even if this was not explicitly required by the programmes and goes against the spirit of European integration and the Single Market (Dinan 2005, 2006; Defraigne and Nouveau 2022).

The Transfer of Industrial Policy to the EU: A Stop-and-Start Process Determined by Pull and Push Factors

There have been phases of acceleration and slowdown in the European integration process. The acceleration phases were characterized by a convergence of interests among the most important national business and political elites for which the status quo was not sustainable. Such convergences were created by a combination of push and pull factors, some economic and others of a geopolitical nature. By "push factors" we mean factors that increase the cost of the status quo in terms of the distribution of powers. These factors push Member

[22] See Chapter 7 of this volume.

States towards more integration. "Pull factors" are those that encourage Member States to integrate more deeply in order to reach new potential gains linked to integration.

In the first acceleration of European economic integration that took place in the 1950s with the creation of the ECSC, along with the European Economic Community (EEC) and its common market, the pull factor was the need to adapt to new methods of industrial production.[23] To adopt to the US Fordist large-scale standardized production methods, European business and political leaders realized that their national markets were too small and that there was a need for a wider continental market closer to the US in size. In parallel, a push factor in the geopolitical sphere played a similar role in favour of the transfer of economic powers to the supranational level. This was the fear of Soviet Union and communist influence in Western Europe, along with US pressure for stronger unity across Western Europe (Hogan 1989). US administrations used their financial leverage through the Marshall Plan and the European Payment Union to push their Western European allies towards a more integrated European market. They also imposed the reinsertion of West Germany's industry in Western Europe (Dinan 2005). As soon as the fear of a Soviet invasion and of communist parties in Western Europe seizing power receded in the minds of national political and business elites, national rivalries became less constrained, considerably slowing down the European integration process in the late 1950s, 1960s and 1970s (Defraigne 2004). National governments erected various barriers to protect their national champions and took steps to weaken the supranational institutions (first the High Authority of the ECSC, notably by Germany, then the Council and the Commission, notably by France) (Witschke 2009; Warlouzet 2011).

The second phase of acceleration of the European integration process took place in the 1980s, with the launch of the European Monetary System in 1979 that would culminate in the adoption of the Euro in 1999, and with the White Paper on the Single Market of 1985, as well as the 1987 Single Act, which wrote the objective of realizing the internal market by the end of 1992 into the Treaties.[24] The push factor that made the status quo on Community industrial policy unsustainable was the need to restructure the European economy. The EEC had faced a decade of stagflation in the 1970s and increasing industrial competition from Japan and the East Asian newly industrialized economies (Gillingham 2003; Warlouzet 2018). Furthermore, there was the development of new ICT technologies in which the US and Japan were clearly leading against the smaller European firms (Chandler 2005). Finally, US unilateralism

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[23] See Chapter 5 of this volume.
[24] See Chapter 6 of this volume.

in trade and monetary policy – with the Nixon administration upending the Bretton Woods monetary system in 1971[25] – had revealed the vulnerability of the EEC to US protectionism and to exchange rate instability (James 2012).

The 1980s were also characterized by major technological changes in electronics, robotics and ICT. European industries had to adapt to the technological development of robotization and to the differentiation and quality upgrading of their manufactured products if they wanted to meet the challenge of new international competition coming from the US and East Asia. This shift towards post-Fordist differentiated production required more investment in R&D, robotization and marketing that generated new economies of scale. This implied a rapid increase in the size of the largest enterprises in capital-intensive industries. The need for deeper rationalization of production capacities of European industries was recognized among European technocrats, scholars and leaders of several European MNEs (Defraigne 2004).

The industrial transformation was the major pull factor in favour of an acceleration of European integration and created convergence among the most competitive European MNEs. They came to favour removing protectionist measures set up by Member States to shield their domestic enterprises from intra-European competition. A better integrated Community would enable a selection of the fittest enterprises through an intensification of intra-European competition. The inefficient or small firms unable to adapt to the new post-Fordist differentiated production methods would be eliminated and the fittest could grow and benefit from the economies of scale generated by these new methods of production (Defraigne 2004; Dinan 2005; Gillingham 2003).

In this context, many of the largest European MNEs actively supported the European Commission in its attempt to transform the common market into a much better integrated single (or internal) market that guaranteed the freedom of movement of goods, persons, services and capital. The European Round Table of Industrialists (ERT) was set up in 1983 with the help of the Commission, in particular Commissioner Etienne Davignon, who was in charge of Industrial Affairs and Energy during the Thorn Commission (1981–85). The ERT was composed of the CEOs from the largest European MNEs (17 initially,[26] later extended to 60) (ERT 2012). It played a crucial role

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[25] The notorious comment by the US Secretary of the Treasury John Connally at the G-10 meeting in Rome in 1971 springs to mind: "The dollar is our currency, but it's your problem".

[26] Pehr G. Gyllenhammar (Volvo) hosted the first meeting that was attended by the former president of the European Commission François-Xavier Ortoli and Commissioner Étienne Davignon, as well as the CEOs Wisse Dekker (Philips), Karl Beurle (Thyssen), Carlo de Benedetti (Olivetti), Curt Nicolin (ASEA), Harry

by supporting Commission President Jacques Delors and Lord Cockfield, the British Commissioner for the internal market, who would play a leading role in the establishment of the single market. The ERT even actively contributed to the drafting of the 1985 White Paper on the Single Market (Gillingham 2003). The 1986 Single Act, entered into force on 1 July 1987, would integrate into the EEC Treaty the internal market objective, along with adapted decision-making procedures to facilitate the adoption of the over 270 measures to realize the internal market (Warlouzet 2018). The ERT set up a watchdog that continuously lobbied national governments to make sure that they respected the guidelines and the schedule of the "Europe 1992" process. Scholars such as Paul Geroski and Alexis Jacquemin published influential articles showing that the only way to simultaneously enable European firms to fully benefit from economies of scale while avoiding the fate of turning into "sleepy giants" dominating their domestic market from a monopolistic position was to create effective competition on an integrated EEC market[27] (Geroski and Jacquemin 1985). The 1988 Cecchini report produced by distinguished European scholars and sponsored by the Commission highlighted the "cost of Non-Europe", assessing the financial costs of the low level of economic integration of the EEC compared to the US (Dinan 2005).

This convergence of interests between national economic elites, supported by EU technocrats and scholars, empowered the EU institutions to push back intra-Community technical barriers to trade and to enforce stricter discipline on State aid, thereby reducing national industrial policies and strengthening intra-EEC competition (Warlouzet 2018).[28] In parallel, the Single European Act conferred new competences to the Community in terms of R&D with the launching of the framework programmes. States relinquished some of their industrial policy tools and the Community received new tools.

The creation of the single market and of the EU with the 1992 Maastricht Treaty were seen as sufficient steps to pull Europe out of the structural crisis of the 1970s and early 1980s. However, inspired by the neoliberal views of Germany and the UK in particular, as embodied by Commissioners Peter Sutherland, Leon Brittan and Martin Bangemann, the focus of EU institutions in the 1990s and 2000s was on strengthening competition policy and making

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Gray (United Technologies), John Harvey-Jones (ICI), Wolfgang Seelig (Siemens), Umberto Agnelli (Fiat), Peter Baxendell (Shell), Olivier Lecerf (Lafarge Coppée), José Bidegain (St Gobain), Wisse Dekker (Philips), Antoine Riboud (BSN), Bernard Hanon (Renault), Louis von Planta (Ciba-Geigy) and Helmut Maucher (Nestlé).

27 This national champions policy may have left Europe with a population of sleepy industrial giants that were ill-equipped to meet the challenges of the 1970s and 1980s (Geroski and Jacquemin 1985).

28 On State aid law and policy, see also Chapter 2 of this volume.

sure that the four freedoms of movement of goods, services, labour and capital were effectively enforced (Bangemann 1992). The Commission was also given new powers on merger control in 1989 to ensure a high level of competition in the internal market.

The Barroso (2004–14) and Juncker (2014–19) Commissions did not take major steps towards European economic integration. As various chapters in this volume demonstrate, the two main EU industrial policy strategies adopted under their watch, i.e., the Lisbon Agenda and Europe 2020, were characterized by a high degree of intergovernmentalism and very few legally binding targets. Industrial policies continued to be decided mainly at the national level and most industrial policy funding (including research programmes) was determined and operated by the Member States not by EU institutions.

The analysis of pull and push factors enables us to understand the alternation between periods of acceleration and slowdown in the transfer of industrial policy tools from Member States to EU institutions. Acceleration phases occurred when technological, macroeconomic and geopolitical factors contributed to a configuration that created a greater convergence among national economic elites, which considered the status quo unsustainable and supported a transfer of power to the EU level.

Could the Covid-19 crisis of 2020–21 lead to greater convergence among national governments and business communities to allow another wave of transfer of industrial policy competence to the supranational level? In the midst of the crisis, Chancellor Angela Merkel declared that "the pandemic has revealed how fragile the European project still is" and that "the EU is facing its biggest challenge in history" (DW 2020). In parallel with the Covid-19 crisis, the EU also faces other major challenges. By the end of the 2010s, the US and China were increasingly using strategic trade policies that challenge the status quo of global economic governance. Furthermore, this increasing rivalry has brought geopolitical considerations into the restructuring of international production networks and technological standards. The EU is now facing the threat of becoming increasingly irrelevant in the global rivalry of the two superpowers, and concomitantly of experiencing serious constraints in terms of technological autonomy for the key strategic industries of the future.

Other EU Specificities Impacting Industrial Policy

The environmental dimension

The EU has faced pressure from significant sectors of European public opinion and civil society to create legally binding environmental standards that are stricter than those defined by global multilateral arrangements. This has led to constraints for industrial policies pursued at the EU and Member State levels. The EU is not completely exceptional in this regard – Japan, for example,

also has a higher level of environment standards. This has raised the issue of using environmental standards as technical barriers to trade in order to compel trade partners to adopt similar constraints to ensure a level playing field for competition.

The protection of human rights, including social rights

The EU has developed high standards to protect fundamental rights (Wouters et al. 2020). This imposes constraints that can affect the development of EU industrial policy.

The 2016 General Data Protection Regulation (GDPR), for example, provides citizens with legal protection against undue capture of their personal data by businesses.[29] The GDPR impacted non-EU firms and notably US and Chinese Big tech.[30] While the GDPR is supposed to protect European citizens, some analysts have questioned its efficiency and consider it a serious impediment for the development of key ICT sectors, notably artificial intelligence and the Internet of Things. European firms have to compete with US and Chinese firms whose authorities are more lenient regarding personal data collection and use, leading to an asymmetrical position in these new technologies.

Another example regarding how human rights protections may impact how industrial policy is carried out relates to the protection of workers. Underpaid penal labour, a practice used by some countries (notably in the US and China that combined have at least one million people working in prisons) can constitute an indirect horizontal policy as states subsidize coerced labour, a practice that lacks both transparency and humanity. Such practices are at odds with EU policies, characterized by a high degree of protection of human rights – including at the workplace, such as the European Pillar of Social Rights – and a tradition of social dialogue.

Cultural and linguistic heterogeneity

The EU is much more culturally heterogeneous than other advanced economies. The diversity of languages, business practices, civil servant services and the practices of research universities is an additional challenge for the EU. Labour mobility for researchers and cooperation in R&D is easier to organize between national universities and laboratories in the US, the UK, Japan, South

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[29] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), OJ L 119, 4.5.2016, p. 1.

[30] See for example the judgment of the European Court of Justice of 16 July 2020 in Case C-311/18, *Schhrems*, ECLI:EU:C:2020:559, which puts limits on the transfer of personal data between the EU and the US.

Korea and China. Coordinating an EU industrial policy implies working with civil servants and professionals from Member States with different work cultures and contrasting conceptions regarding state intervention in the economy. While such differences can also occur outside the EU, they are far less significant within the other most advanced economies of Asia or North America.

THE LIMITS OF THE EU WHEN IT COMES TO INDUSTRIAL POLICY

The Absence of an *Esprit de Corps* among EU Industrialists Caused by the Rivalry of National Business Elites

For historical reasons, European business elites are still mostly divided across national lines. Europe witnessed a centralization of power from the late Middle Ages to the nineteenth century in which aristocrats built, through military means, absolutist states leading to the establishment of the borders of Western European states. To finance their armies and maintain their power, some absolutist rulers pursued a mercantilist industrial policy to develop national infant industries, erecting trade barriers and thereby fragmenting the European trading space (Anderson 1996). In parallel, they strengthened national infrastructure networks and eradicated local barriers within their territory, leading to a more integrated national market.

The continued rivalry between national business communities and between their respective states led to deadlocks in the European construction process, as several Member States adopted national champion strategies that distorted European competition and erected technical barriers to trade that fragmented the common market and continue to limit the degree of economic integration of the single market (Dinan 2005; Defraigne 2004).

This does not mean that the situation of national business communities in the EU has been characterized by a status quo over the last decades. The 1993 internal market and the introduction of the Euro have removed several obstacles, thereby fostering intra-European competition. This acceleration of competition led to mergers and rationalization of production capacities in several industries (car, chemicals, cosmetics, pharmaceuticals, steel and food industry) throughout the 1990s, 2000s and 2010s (Defraigne and Nouveau 2022). As these processes developed, two phenomena emerged that have led to a greater convergence between the various national business communities. Several transnational M&A took place which, in some cases, created "European" champions. A move towards a capital union, a stock exchange market regulated at the EU level and more convergent corporate law systems should facilitate the interpenetration of shares at EU level. This, in turn, could progressively induce the Member States' respective business elites to conver-

gence and increasing homogeneity, a condition for the emergence of an *esprit de corps* vis-à-vis the rest of the world.

Another important consequence of the M&A wave that accompanied the creation of the single market and EMU was the disappearance of national champions from small Member States that did not have the resources to enable their large national firms to resist competition or being taken over by bigger national champions from other Member States. Small Member States such as Belgium, Portugal and Austria, lost several national champions in this merger wave. An important part of their business community that had managerial positions and strategic control were transformed into rentiers managing international investment holdings (Defraigne and Nouveau 2022). This considerably reduced their need to lobby for a national defensive industrial policy in the name of national economic sovereignty. Small Member States have been increasingly tolerant to FDI, even in what are still considered national strategic industries such as energy, telecoms, cars and defence.

European Technological Dependence on Transatlantic Relations

The dependency on US military technology has been an important characteristic of Western European economies since the end of the Second World War. The Cold War generated strong geopolitical ties between Washington and most Western European nations, particularly after the creation of NATO in 1949.[31] Most EU Member States relied on US military technology and did not need to develop industrial defence capacity to reach strategic autonomy, as the Soviet Union did at exorbitant costs and as China has been pursuing since the 2010s. This situation enabled Western European countries to invest a smaller share of their GDP in defence compared to the military superpowers and to concentrate more on civilian industries. However, it also led to US firms having an edge over their EU counterparts in dual technologies such as the Internet and some high-tech aerospace systems. In industries relying on these technologies, EU firms have become junior partners to larger US firms or are dependent on key US high-tech inputs.[32] Naturally, in some niches, US firms can be dependent on EU firms' technology (e.g., 5G infrastructure with Nokia and Ericsson), but this is far less common than the reverse, as case studies in this volume outline.

Over the years, the NATO alliance has also generated several technological co-operations, joint ventures and business alliances between US firms and

[31] Out of 27 EU Member States, 21 are also NATO members. Only Austria, Malta, Cyprus and Ireland do not have NATO membership. In 2022, Sweden and Finland applied for NATO membership.

[32] See Chapters 8, 11 and 12.

firms from European NATO countries. These transatlantic ties have no equivalent in the EU, apart from the UK, which was an EU Member until 2020. No other non-EU military power enjoys similar technological links with EU firms (i.e., China, Russia, Japan, India, South Korea or Saudi Arabia). This constrains the autonomy of EU industrial policy, as various NATO countries (notably Germany, Denmark, the Netherlands, Belgium and Italy and most Eastern European Member States) have strong constituencies favouring the status quo, which implies privileged military and technological cooperation with the US. It is therefore unlikely that future EU policy will be inspired by a Gaullist geopolitical vision of Europe, despite recurrent initiatives by French political leaders, such as Jacques Chirac and Emmanuel Macron, who have called for greater European military unity and a decreased role for NATO.

A TENTATIVE PROSPECTIVE: WHAT POSSIBLE OUTCOMES FOR THE FUTURE OF EU INDUSTRY AND TECHNOLOGY?

The phenomena outlined in this chapter and analysed further in the chapters of this volume, lead us to identify three possible scenarios for the future of EU industry and technology, each implying a radically different outcome.

Scenario 1: the EU as Junior Partner in a Continuing Transatlantic Alliance

In this scenario, the rivalry between Member States and between national business communities continues and prevents the transfer of more powers related to industrial policy to EU institutions. This status quo implies that the degree of autonomy of the technological and industrial base of the EU and its Member States would remain limited in the coming decades. Most Member State firms would not catch up with US and Chinese Big Tech in industries characterized by important network economies and in industries relying on dual technologies where the size and the resources of a centralized state play a key role. EU firms could continue to be highly globally competitive in mature industries (e.g., transport vehicles, steel, chemistry, construction, cosmetics, luxury, food and drinks, banking), but with regard to new technologies, would be stuck in the position of junior partners or specific niche component producers (e.g., in ICT, dual technologies).

Because of its historical alliance with the US – implying a reliance on US military capacity and technology – the EU would be driven to accept the dominant position of US Big Tech and adopt several US technological standards. The EU would continue to suffer a brain drain as a significant share of its highly qualified labour force would be attracted by the biggest US Marshallian

districts in these new technologies. If US-China geopolitical tensions continue to intensify, the effects outlined above would reduce EU technological cooperation with China. This dependency on US technology and the several transatlantic alliances between firms could also lead to a deeper commercial integration between the US and the EU, possibly bringing about a relaunching of negotiations to reach a transatlantic trade agreement. In this scenario, NATO would remain the most important framework for the defence strategy of most EU Member States. The EU would continue to act as a "civilian power" with limited global influence in foreign policy and security. It would be constrained by its alignment with US positions on key strategic issues, but would remain a significant player in some aspects of trade and monetary governance for the next decades.

Scenario 2: the Finlandization of the EU[33]

As in the preceding scenario, the EU would still be divided by the rivalry between the large Member States and between their respective national business communities. Therefore, this scenario would not see a significant increase in EU strategic autonomy.

However, this second scenario considers the possible emergence of US domestic political and social factors (e.g., more inequalities, intensified inter-community tensions, the rise of far-right movements and isolationist currents) that could drive the US to adopt a more bullying mercantilist and unilateralist trade diplomacy, even more abruptly than during the Trump presidency. This exogenous factor of rising US unilateralism would weaken transatlantic ties at the strategic and commercial levels, especially if the US continued its strategic redeployment engaged under President Obama away from a relatively declining Europe towards an economically vibrant Pacific Asia.

This evolution would transform the EU into a relatively neutral technological standard-taker from US and Chinese Big Tech. EU industry would be constrained to niche markets adapting to technological standards set by the two giant technological leaders. The EU would also suffer from brain drain effects in favour of both economic superpowers. The EU influence in global governance would slowly decline with its falling share of global GDP and the EU would be unable to set standards in new key industries where the centralization of state power matters.

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[33] The Oxford Lexicon defines "Finlandization" as "the process whereby a country is induced to favour, or refrain from opposing, the interests of a more powerful country, despite not being politically allied to it (originally with reference to the influence of the former Soviet Union on its neighbour Finland)". In our second scenario, the EU would refrain from opposing both the US and China.

Scenario 3: the EU as a Global Power with Strategic Autonomy in a Multipolar World

In this scenario, intra-EU capital interpenetration generated by intra-EU mergers between national champions and a capital union would lead to a greater degree of convergence and cohesion among the national business communities of the Member States. This evolution could enable more transfers of power to the EU level in the field of industrial policy. The pooling of EU research programmes would reduce the duplication of competing research programmes and favour the rationalization of high-tech Marshallian districts, thereby generating more external economies of scale and reducing brain-drain effects.

A greater cohesion of European business communities and larger resources at the EU level might encourage a more ambitious strategy to create European champions that could compete against US and Chinese Big Tech. EU firms could also become global standard setters in the new industries characterized by network economies and dual technologies. This could provide the EU with a greater degree of strategic autonomy and a more symmetrical position vis-à-vis both the US and China.

Other geopolitical, political and historical factors that cannot be forecast will undoubtedly affect the positioning of the EU in this multipolar world. However, in this scenario the greater degree of strategic autonomy would provide more room for manoeuvre for the EU and its Member States. While this does not necessarily imply a loosening of the strategic alliance with the US or of existing deep transatlantic commercial ties, the EU would have greater capacity to shift alliances, and even to question the primacy of NATO. If the greater technological and industrial convergence between the large Member States continues to facilitate a transfer of powers to the EU level, the Union, short of being a full federal state, would nevertheless possess sufficient sovereign powers to become a major power, not only in the economic field but also in the strategic and diplomatic fields.

The reader's own political preferences will determine which scenario can be considered the best outcome in normative terms. The analytical approach in the present volume is more descriptive than normative. Many elements outlined in the chapters of this volume will probably invoke scepticism in the reader regarding the plausibility of the third scenario in the absence of a significant and fast transfer of (industry-related) regulatory and budgetary powers from the Member States to the EU. However, it cannot be excluded at this stage, as some processes related to intra-EU mergers and capital interpenetrations have not yet been completed and as the "stop-and-start" process of transfer of powers from national to the EU level continues despite regular setbacks.

The present volume reveals how the issue of industrial policy has been and remains decisive for the future of the Union, not only in economic terms but also geopolitically, as it will impact the governance of the multipolar global economy. This volume aims to address in depth the difficulties of implementing tools related to industrial policy in the very specific and complex context of the EU and its Member States.

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