Business-government relations in the digital age

Corporate responses to policymaking in the European Union

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CHAPTER 5

Sustainability in a Digital World: Geopolitics, Values and International Business Policy[7]

5.1 Introduction

The concept of sustainability has been a focal point of scholarly discourse for decades. While definitions and understanding of sustainability are still wide-ranging, there is a common tendency to approach it through the trifocal lens of environmental, social/ethical and economic development dimensions (e.g., Bansal, 2005; Elkington, 1994). This understanding aligns with the Brundtland Commission' 1987 'sustainable development' concept (WCED, 1987), which steered the international debate towards the now widely embraced Sustainable Development Goals (SDGs), formally adopted by the United Nations (UN) in 2015. It is widely accepted that sustainability and the SDGs matter for international business (IB) and multinational enterprises (MNEs), although the implications of this broad policy agenda and its inherent political contestations (see, e.g., Scheyvens et al., 2016; Weber, 2017) are yet to be fully grasped.

In the global landscape, it is evident to IB scholars, practitioners, policymakers and society at large that MNEs are increasingly held accountable for addressing social, environmental and ethical problems that arise within their operational jurisdictions. These pressures affect their trade, investments, production and value chains (Fransen et al., 2019; Kolk, 2016; Serdijn et al., 2021). In response, MNEs employ market and nonmarket strategies in order to successfully navigate the intricate nuances of diverse institutional contexts (cf. Baron, 1995). Concurrently, they are actively shaping their institutional environment, motivated by economic objectives (Marquis & Raynard, 2015) and/or the common good (Matten & Crane, 2005; Scherer et al., 2016).

From an international business policy (IBP) perspective, nonmarket strategies warrant particular attention. Interestingly, their importance was highlighted early on in IB already, in a 1976 article, the first one on the topic

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found in the *Journal of International Business Studies* (cf. Kolk, 2016). Back then, Gladwin & Walter (1976, p. 57) stated:

"Bribery, product safety, occupational health, environmental protection, worker participation, minority employment, inappropriate technology, urban blight, political influence, false advertising, expatriate management, and social dislocation are a few of the many social and political issues today facing business enterprise. Perhaps never before has the scope of corporate accountability been extending so rapidly, and the struggle to maintain social legitimacy in the private sector so difficult. Dealing with such non-market issues in a reasonably coherent national setting is one thing-dealing with them in a multinational setting is another matter altogether."

Obviously, in the current time and age, many things have changed as well. Particularly notable is the advent of digitalization, sometimes referred to as Industry 4.0 (Schwab, 2015). Digitalization – defined as the development and utilization of advanced technologies by firms, governments and civil society – has the potential to either alleviate or exacerbate sustainability issues. Digital technologies, including AI, BDA, additive manufacturing and digital platforms have demonstrated both positive and negative impacts (Ciulli & Kolk, 2023; Ocelík et al., 2023). These technologies facilitate the development of human rights (Kalliny et al., 2015) and the growth of the circular economy (Oyinlola et al., 2022), provide marginalized social groups access to financial capital (Kabengele & Hahn, 2021), and empowered firms to champion social and environmental causes (Nwagbara, 2013), including more efficient operational processes with less waste. However, digital technologies have also enabled the exploitation of vulnerable stakeholders along the firm's value chain (Boyer, 2021), and risk exacerbating overconsumption, notwithstanding their micro-level environmental benefits (Dauvergne, 2022). Noteworthy are also the implications for privacy, which directly relate to the social/ethical dimensions of sustainability.

These diverse implications have revitalized political debates on societal norms and values in the digital age, most notably by the EU in its regulatory approach to privacy issues in data governance (cf. Irion et al., 2021). A torrent of legislative proposals has emerged, addressing areas from AI and digital markets to platform intermediaries. Moreover, with the announcement of the so-called ‘twin’ (green and digital) transition, the EU aims to uphold the values originally enshrined in the European project, and sends a clear signal regarding its ambitions to become the global leader in value-based governance (Von der Leyen, 2020, 2021, 2022). Given its intent to regulate digitalization, its regulatory competence (cf. Clegg, 2019) and the extra-territorial influence of European rules and regulations in the digital realm in particular, the EU emerges as a pivotal player in IBP. The so-called ‘Brussels effect’ (Bradford, 2020) in the governance of digital technologies, extends to broader sustainability issues, echoing California’s ‘standard-setting’ role in the 20th century (the “California effect”, cf. Vogel, 1997), most notably in stringent vehicle emission regulation (cf. Pinkse et al., 2014).

The EU’s approach, especially in comparison with other major economies, becomes more intriguing considering shifting societal values, regulatory traditions (EC, 2022b; Irion et al., 2021; O’Hara & Hall, 2018), and geopolitical realities. In stark contrast to Gladwin and Walter’s 1970s paper, two critical geopolitical developments currently shape IBP: Russia’s illegal annexation of Crimea in 2014 and the ensuing war in Ukraine; and the escalating tensions between the U.S. and China, marked by trade conflicts and territorial disputes. Although geopolitics was always part and parcel of sustainability, inter alia regarding energy security and the access to and availability of material resources (cf. EC, 2020b), it has never received such ample attention as from early 2022 onwards. A case in point is the focus of the European Commission’s (EC) third Strategic Foresight Report (SFR), entitled “Twinning the green and digital transitions in the new geopolitical context” (EC, 2022b).

Given the EU’s global interconnectedness through international trade and investment, and its critical dependence on other regions, we focus this chapter on key areas in the EU pertinent to the twin transition. Caught between a rock and a hard place, the EU is the ‘arena’ where geopolitical, societal and technological complexities, including the inherent difficulties of arriving at coherent and effective decision-making, and the actual implementation of intentions and rules, come to the fore most prominently. After providing context on the EU Green Deal, we delve into IBP issues central to sustainability in a digital world. These include the industrial transformation to net-zero technologies, critical raw materials, and semiconductors. The chapter concludes with a discussion on implications for international business policy, bridging both research and practice. The central thesis of this chapter posits that geopolitical conflicts and the emergence of digital technologies, embedded in distinct societal values, increasingly influence the realization of social, economic and environmental sustainability. MNEs will have to adjust to these new realities and adopt a proactive role in shaping emerging policies.

5.2. The EU Green Deal

In December 2019, the EC unveiled the EU Green Deal – a comprehensive set of policy initiatives that aim to transform the EU into a more sustainable and climate-neutral economy by 2050 (EC, 2019). The EC asserts that the EU Green Deal is an attempt to turn "an urgent challenge into a unique opportunity" (EC, 2019, p. 20) by striving to become the global leader in environmental, climate and energy policies.

The EU Green Deal features a broad range of policy objectives. These include the achievement of climate neutrality; the supply of clean, affordable and secure energy; the mobilization of industry for a circular economy; energy-efficient construction and renovation of buildings; the acceleration of smart mobility; the design of a green food system; the preservation and restoration of ecosystems and biodiversity; and the reduction of pollution and improvement of air quality. Key environmental targets of the EU Green Deal include becoming the first climate-neutral continent by 2050; reducing net greenhouse gas emissions by at least 55 percent compared to 1990 levels; and planting 3 billion additional trees by 2030 . The EU Green Deal forms an integral part of the EC's strategy to implement the UN's 2030 Agenda and the SDGs (EC, 2019, p. 3). The EU Green Deal was followed up by a slew of legislative proposals and policy documents, including the European climate law , which wrote into law the goals set out in the EU Green Deal and entered into force in 2021; the European Industrial Strategy, first proposed in 2020 and updated in 2021 due to the covid pandemic (EC, 2020a, 2021d); and the "Fit for 55" package (EC, 2021a), which proposed specific targets for meeting the EU Green Deal objectives.

Significantly, the EU Green Deal underscores the importance of investing in, and promoting the application of, digital technologies that bolster sustainable development. At the same time, the EC acknowledges the potential trade-offs between economic, environmental and social objectives (EC, 2019a, p. 4). Over time, this understanding has matured into an acknowledgement that digitalization and sustainability are interwoven – a relationship that brings both opportunities and challenges. As such, the EC contends that the effective governance of digital technologies can contribute significantly to creating a climate-neutral and resource-efficient economy. This entails not only utilizing digital technologies to reduce energy usage across sectors such as energy, transport and agriculture, but also to increase their own resource efficiency.

In June 2022, the EC published its 2022 SFR, as mentioned in the introduction, which reflected on the synergies and tensions between the green and digital transitions; the critical technologies intertwining both transitions; the geopolitical economic, social and regulatory factors influencing these twin transitions; and the critical areas necessitating further action. The 2022 SFR expanded on previous policy documents by the European Council and the EC, which also stressed the importance of digital technology for the EU's recovery, prosperity, security, competitiveness and societal wellbeing. In essence, the EC's regulatory agenda underscores the utilization of digital technologies to attain sustainability objectives, and enhance the energy-efficiency of these technologies, while upholding European values such as fairness, justice and inclusivity.

Furthermore, the EC has unabashedly stated its aspiration for global leadership in environmental, climate and energy policy (EC, 2019a, p. 20). It aims to support and advocate for the Paris Agreement; bolster bilateral engagement with partner nations; and establish international standards that apply across global value chains (GVCs). However, several significant geopolitical disruptions, in addition to the COVID-19 pandemic, have confounded this ambition, highlighting climate change as a regional and national security issue. The war in Ukraine has galvanized EU member states to accelerate the adoption of renewable energy to reduce dependence on Russian gas . Meanwhile, escalating geopolitical tensions between China and the U.S., including the ongoing dispute over the legal status of Taiwan, have prompted EU policymakers to promote domestic production and sourcing of goods and services deemed integral to national security, such as semiconductors and critical raw materials (EC, 2021b, 2021d, 2022c). Consequently, the EU Green Deal is being continually influenced by the EU's endeavor to lessen its reliance geopolitical adversaries, reduce vulnerabilities, and enhance resilience and strategic autonomy. Paradoxically, this push for national net-zero technologies also stokes new tensions between strategic allies, such as the EU and the U.S..

5.3. Net-zero technologies

In the aftermath of the COVID-19 pandemic, with the associated socio-economic disruptions, the EU responded with a formidable stimulus package exceeding EUR 2 trillion. This package aimed to secure resources for its strategic priorities, specifically digitalization and the EU Green Deal (EC, 2021c). As expressed by the European Commissioner for Budget and Administration, the stimulus package aspires to "rebuild a post-COVID-19 Europe, which will be greener, more digital, more resilient and better fit for the current and forthcoming challenges." (EC, 2021c, p. 5). The stimulus package comprises the EU's long-term budget (EUR 1.211 trillion) and NextGenerationEU (EUR 806.9 trillion), an interim mechanism to recover from COVID-19's fallout.

The centerpiece of the NextGenerationEU package is the Recovery and Resilience Facility (RRF), which provides loans (EUR 358.8 billion) and grants (EUR 338 billion) to support reforms and investments across EU member states. Member states submit national reform and investment plans to the EC for evaluation, followed by approval from European Council on a case-by-case basis. Upon approval, the Council provides an initial 13 percent of total support upfront to jumpstart the proposed project . Interestingly, the EC posits that the EU budget is "not a zero-sum game" (EC, 2021c, p. 12). All EU member states stand to gain. The EC estimates that, on average, benefits from participating in the single market outweigh the costs by a factor of six for EU member states (EC, 2019a). However, the U.S. has also been active in stimulating net zero technologies, and it appears that, from the perspective of EU officials, this 'win-win' situation does not extend beyond their borders.

A prominent example of burgeoning tensions between the EU and U.S. is the 2022 Inflation Reduction Act (IRA). Celebrated by the U.S. Environmental Protection Agency as "the most significant climate legislation in U.S. history, offering funding, programs, and incentives to stimulate the transition to a clean energy economy" , the IRA signifies the U.S.'s resolve to stimulate the transition to a green economy, hitherto primarily driven by ambitious state-level regulations that ratcheted upwards to the federal level (cf. Vogel, 1997). As such, the IRA marks a radical shift in U.S. climate action and broadcasts an optimistic message that the world's greatest historical emitter is commencing its responsibilities . Mirroring the policy objectives of the EU Green Deal, the IRA aims to cut greenhouse gas emissions by an estimated 40 percent below 2005 levels by 2030.

However, European policymakers have expressed strong reservations about the IRA, contending that it contains discriminatory content requirements that could deter green technology investments across the EU. By providing financial incentives for MNEs to relocate production to the U.S., investments in green technologies such as solar panels, wind turbines and clean hydrogen throughout the EU could be undermined. In a public comment submitted to the Internal Revenue Service, EU officials commented that: "If implemented in its current form, the [IRA] risks causing not only economic damage to both the U.S. and its closest trading partners, resulting in inefficiencies and market distortions, but could also trigger a harmful global subsidy race to the bottom on key technologies and inputs for the green transition. [..] Moreover it risks creating tensions that could lead to reciprocal or retaliatory measures" .

Although the IRA marks a radical shift of U.S. climate policy, it fits into a pattern of large economies that have significantly increased government support for, and involvement in, the production of net zero technologies. Other large economies, including Japan, a resource-scarce country heavily dependent on energy imports, plans to invest approximately EUR 140 billion to achieve a carbon-neutral economy . Similarly, India, the UK and Canada are proactively planning to stimulate the production of net zero technologies. In short, many countries are heavily engaging in government support to innovate and enhance their production capabilities of net-zero energy technologies, as these technologies are at the heart of powerful geostrategic interests.

In light of this, the EU has proposed the Net Zero Industry Act (NZIA) to bolster the EU's domestic manufacturing capacity and ensure a sustainable supply of net zero technologies that support the EU Green Deal (EC, 2023). Critics, however, argue that it may impede the EU's green transition, overlook fundamental obstacles in the EU's business environment, such as the lack of a genuine single market, and signal to other countries, including some key geopolitical allies, that the EU will not welcome foreign imports .

While it remains to be seen how the various stimulus packages will unfold, given that there will be accommodation to concerns by friendly nations (as notable already after IRA was launched in that some exceptions were being made for EU firms), implications for IB are substantive, depending on the type of firms involved, which we will further explore in the implication and conclusion sections.

5.4. Critical metals, minerals and materials

Critical raw materials are minerals, metals and other basic materials that are integral to modern industrial production, while simultaneously posing significant supply risk or vulnerability. Take cobalt, for instance, a rare earth metal indispensable for clean technologies like electric vehicle batteries and solar panels. The sustainable supply of cobalt is thus fundamental for meeting the objectives set out in the EU Green Deal. Yet, the EU imports 68 percent of its cobalt from the Democratic Republic of Congo (EC, 2020b). The dependency on foreign imports extends to numerous other critical raw materials as well, including bismuth, borate and lithium.

Table 5.1 includes a comprehensive list of critical raw materials as per the EC, highlighting the main global producers, EU sourcing countries, the EU's import reliance and popular industrial applications. As demand for these raw materials is projected to grow in the coming years due to the energy transition (Gregoir & van Acker, 2022), it will put additional pressure on Europe to secure their access. For example, the International Energy Agency estimates that if the U.S. and Europe maintain their current consumption levels, existing resources or planned mines could cater to merely about 50 percent of the lithium for transitioning towards electric mobility (IEA, 2022). The global supply chain disruptions witnessed during the COVID-19 pandemic have further underscored the inherent risks of dependence on foreign markets.

Undeniably, the EU's policy on critical raw materials has undergone a radical shift. In 2008, the EC published a communication titled "The raw materials initiative — meeting our critical needs for growth and jobs in Europe" (EC, 2008). Already acknowledging the dependence of Europe on import of metals such as cobalt, platinum and titanium, the EC asserted that reliable and undistorted access to raw materials is essential for maintaining the

EU's economic competitiveness. Back then, the EU's official policy was to secure access to raw materials on global markets through diplomacy, engaging resource-rich emerging economies like China and Russia in constructive dialogue (EC, 2008, p. 6). In contrast, recent policy documents promote a diversification of supply chains, emphasizing the need for the EU to reduce reliance on Chinese and Russian imports. This shift correlates with the EU's current view of critical raw materials as pivotal to the EU Green Deal. The EC has consequently introduced policies to decrease dependency on imports from nations perceived as untrustworthy or whose political regimes contradict European values, as exemplified in the recently proposed Critical Raw Materials Act (CRMA).

Table 5.1. Critical raw materials, including their main global producers, industrial applications, and EU sourcing countries.

Raw material	**Global producers**	**EU Sourcing countries**	**Import reliance**	**Industrial applications**
Antinomy	China, Tajikistan, Russia	Turkey, Bolivia, Guatemala	100	Aerospace, textiles, automotive, construction
Baryte	China India Morocco	China, Morocco, Germany, Norway	70	Automotive, energy-intensive industries, Health, Construction
Bauxite	Australia, China, Brazil	Guinea, Greece, Brazil, France	87	Aerospace, textiles, electronics, automotive, energy-intensive industries, renewable energy, agrifood, health, digital, construction
Beryllium	United States, China, Madagascar			Aerospace, electronics, automotive, renewable energy, digital
Bismuth	China, Laos, Mexico	China	100	Aerospace, electronics, energy-intensive industries, renewable energy, health, digital, construction
Borate	Turkey, United States, Chile	Turkey	100	Aerospace, electronics, automotive, energy-intensive industries, renewable energy,

				agrifood, digital, construction
Cobalt	Congo DR, China, Canada	Congo DR, Finland, French Guiana	86	Aerospace, textiles, electronics, automotive, energy-intensive industries, renewable energy, digital
Coking coal	China, Australia, Russia	Australia, Poland, United States, Czechia, Germany	62	Automotive, energy-intensive industries, renewable energy
Fluorspar	China, Mexico, Mongolia	Mexico, Spain, South Africa, Bulgaria, Germany	66	Energy-intensive industries, Agrifood
Gallium	China, Germany, Ukraine	Germany, United Kingdom, China, Hungary	31	Aerospace, electronics, automotive, renewable energy, digital, construction
Germanium	China, Finland, Russia	Finland, China, United Kingdom	31	Aerospace, electronics, energy-intensive industries, renewable energy
Hafnium	France, United States, Russia	France, United States, United Kingdom	0	Aerospace, electronics, energy-intensive industries, renewable energy, digital
Indium	China, Republic of Korea, Japan	France, Belgium, United Kingdom, Germany, Italy	0	Aerospace, electronics, renewable energy, digital
Lithium	Chile, China, Argentina	Chile, United States, Russia	100	Aerospace, electronics, automotive, energy-intensive industries, renewable energy, health, digital
Magnesium	China, United States	China	100	Aerospace, electronics, automotive, energy-intensive industries, renewable energy, digital, construction
Natural graphite	China, India, Brazil	China, Brazil, Norway, Romania	98	Aerospace, electronics, automotive, energy-intensive industries, digital, construction

Natural rubber	Thailand, Indonesia, Vietnam	Indonesia, Thailand, Malaysia	100	Aerospace, textiles, automotive, renewable energy, health
Niobium	Brazil, Canada	Brazil, Canada	100	Aerospace, electronics, automotive, energy-intensive industries, health, construction
Phosphate rock	China, Morocco, United States	Morocco, Russia, Finland	84	Aerospace, energy-intensive industries, agrifood
Phosphorus	China, Kazakhstan, Vietnam	Kazakhstan, Vietnam, China	100	Aerospace, energy-intensive industries, agrifood
Scandium	China, Russia, Ukraine	United Kingdom, Russia	100	Aerospace, automotive, renewable energy
Silicone	China, United States, Norway, France	Norway, France, China, Germany, Spain	63	Aerospace, textiles, electronics, automotive, energy-intensive industries, renewable energy, health, construction
Strontium	Spain, Iran, China	Spain	0	Aerospace, electronics, energy-intensive industries, health, construction
Tantalum	Congo DR, Rwanda, Brazil	Congo DR, Rwanda, Brazil	99	Aerospace, electronics, energy-intensive industries, renewable energy, digital
Titanium	China, Russia, Japan		100	Aerospace, electronics, automotive, energy-intensive industries, health, construction
Tungsten	China, Vietnam, United States, Austria, Germany			Aerospace, electronics, automotive, energy-intensive industries, health
Vanadium	China, South Africa, Russia			Aerospace, automotive, energy-intensive industries, renewable energy, health, construction

Platinum Group Metals (PGM)	South Africa, Russia		100	Aerospace, electronics, automotive, energy-intensive industries, renewable energy, health
Heavy Rare Earth Elements (HREE)	China, Australia, United States	China, United Kingdom	100	Aerospace, electronics, automotive, energy-intensive industries, renewable energy, health, construction
Light Rare Earth Elements (LREE)	China, Australia, United States	China, United Kingdom	100	Aerospace, electronics, automotive, energy-intensive industries, renewable energy, health, construction

Source: EC (2020b).

Critical raw materials form a central component of the EU Green Deal, a position reiterated by policy documents and recent speeches by EC officials. EU Commissioner Thierry Breton, for instance, remarked the following: "[…] without secure and sustainable access to the necessary raw materials, our ambition to become the first climate neutral continent is at risk" . The EU Green Deal's policy agenda and remarks from EC officials suggest that the EU is committed to leading renewable energy production. However, the extraction, refining and processing of raw materials required for this production often occur outside the EU. Consequently, while the green transition reduces the EU's dependence on fossil fuels – evident from the rapid reduction of reliance on Russian gas imports through the REPowerEU policy program (EC, 2022c) – it also creates new dependencies on imported materials central to a net zero economy (McKinsey, 2020). European public officials perceive these dependencies as hazardous to Europe's resilience and strategic autonomy, leading to the identification of strategic projects along global supply chains, which include extraction, refining, processing and recycling, as well as building up strategic reserves. Furthermore, the EC estimates that around 30 million jobs in the EU in critical sectors such as automotive, aerospace and renewable energy depend on the sustainable supply of raw materials .

The EU regards sustained access to critical raw materials as a national security issue (EC, 2020b). In a 2022 keynote address at the Tallinn Digital Summit, EC Commission President Ursula von der Leyen noted, “You all know the magnets for wind turbines, the cells for solar panels, they all need rare minerals or rare raw materials, and you know the examples. By 2030, Europe's demand for those rare earth metals will increase fivefold – five times what we use today, and today it is already a scarce resource. The first and foremost good news behind this fivefold increase is that it shows that our European Green Deal is moving fast. That is good news. The not so good news is that one country dominates the market: That is China. So we have to avoid falling into the same dependency on China – as we were with oil and gas from Russia. And we have to start now. That is why we are working on a European Critical Raw Materials Act.” (Von der Leyen, 2022b). The U.S. echoes this sentiment, with the Biden administration expressing its goal to reduce China’s dominance in the supply line of critical minerals .

A commonly repeated policy proposal is so-called ‘friend-shoring’ – diversifying supply chains towards trusted partners (EC, 2022d). For the EU, strategy encompasses forging strategic partnerships with Canada and Ukraine to enhance the value, security and sustainability of trade and investment in raw materials and downstream value chains. However, it is important to note that dependence on China and other (distant) countries for critical inputs stems from a deliberate decision by the EU and the U.S. to stop or avoid domestic mining due to the environmental and societal impacts associated with these processes. While *Table 5.1* shows availability of some materials in European countries (and there may be more undiscovered ones), (plans to) putting them in production has already sparked local contestation across the continent .

5.5. Computer chips

Computer chips, also known as integrated circuits, are intricate assemblies of electronic circuits situated on a single plane of semiconductor material. Functioning as the mediators between conductors like metals and insulators like plastic, semiconductors are typically made from silicon, although alternative materials such as germanium or gallium arsenide can also be utilized. By controlling the flow of electrons through the material, semiconductors give rise to transistors, diodes and other critical constituents of modern technology. Semiconductors are responsible for processing and executing instructions in digital devices, and thus enable the proliferation of powerful technologies such as smart refrigerators, military fighter jets and nuclear power plants .

The omnipresence of (advanced) semiconductors in both civilian and military technologies emphasizes their profound significance to national economies and security frameworks. As a testament to this, the EC stressed in 2022 communication that any disruption to the semiconductor supply chain could grind European industries to a halt, and that semiconductors lie at the heart of pivotal geopolitical interests (EC, 2022a). The recent global shortage in semiconductors, which forced the European automobile industry to curtail production, underscores the gravity of such disruptions . The risk of significant supply chain disruptions is further compounded by the soaring demand for digital technologies, such as 5G, cloud computing and AI, and thus the demand for advanced computer chips is growing rapidly . Moreover, geopolitical friction between China and the U.S. has further exacerbated the global shortage of semiconductors, as U.S. export bans on Chinese semiconductor manufacturers , imposed under the guise of national security concerns, have compelled Chinese companies to hoard computer chips.

From a business standpoint, semiconductors are sophisticated products that require cutting-edge knowledge, design and manufacturing competencies. Accordingly, the semiconductor industry is unparalleled in terms of R&D investments and capital expenditures (Boston Consulting Group, 2021). Furthermore, the geographic dispersion of the advanced semiconductor value chain is highly dispersed, with different regions of the world specializing in particular parts, such as chip design, wafer fabrication and assembly, in line with their comparative advantage. This has led to a significant concentration in specific countries. For example, only two companies in the world, Taiwan's TSMC and South Korea’s Samsung, are capable of manufacturing the most advanced computer chips (EC, 2022a). Additionally, the production of industrial machines that manufacture advanced semiconductors is dominated by ASML, a multinational manufacturer of photolithography machines headquartered in The Netherlands. ASML’s unique capability to manufacture ultraviolet lithography equipment, which has taken decades to develop and patent, allows it to produce the most advanced devices currently available. Thus, the significant concentration of the semiconductor market and its geographic dispersion expose potential ‘single points of failure’, triggering policy responses at enhancing supply chain resilience and securing consistent access to computer chips.

In her 2021 State of the Union Speech, Commission President von der Leyen announced a new European Chips Act (ECA), signaling the EU’s intent to become an industrial leader in the semiconductor market, with the ambition to capture at least 20 percent of global production of advanced and sustainable semiconductors by 2030 (Von der Leyen, 2021). This aspiration echoes similar commitments from the U.S., South Korea, Japan and China to foster domestic semiconductor production (EC, 2022a). For instance, the U.S. Congress enacted the Chips and Science Act, allocating substantial investments towards domestic semiconductor manufacturers and technology science. Moreover, the EC argues that the disruptions that resulted from the COVID-19 pandemic highlight the necessity to improve the EU’s ‘open strategic autonomy’ (EC, 2021d, p. 11), which implies that openness to trade and foreign investment are de-emphasized in so-called ‘strategic areas’, including raw materials and semiconductors (EC, 2021b, 2022b).

Caught in the crossfire of the Sino-American geopolitical struggle, the EU finds itself navigating a landscape where the U.S. is seeking to regain its foothold in semiconductor production while mitigating dependencies on foreign chipmakers. This complex web of political maneuvering notably saw the Biden administration issue sweeping export restrictions in October 2022, including a measure to isolate China from the semiconductor industry, as well as making it illegal for American citizens to work for Chinese semiconductor manufacturers (U.S. Department of Commerce, 2022). Having placed strong export restrictions vis-à-vis China, the Biden administration subsequently put significant pressures on strategic allies, namely the EU and Japan, to follow suit. These measures place MNEs within the semiconductor industry in a rather precarious position, as their nonmarket environment is increasingly dictated by geopolitical considerations. For example, in March 2023, the Dutch minister for foreign trade, citing technological and geopolitical developments, announced in a letter to parliament that the Dutch government would be further restricting the export of advanced semiconductor equipment. For ASML, this implied that beyond existing export restrictions on their extreme ultraviolet lithography machines, the company is now also prohibited from exporting its deep ultraviolet lithography systems .

5.6. Implications for MNEs and IB Scholarship

The intricate connection between sustainability goals, digitalization and geopolitics, as we have highlighted above, cultivates a new reality with profound implications for MNEs and the global business landscape. Three points of significance warrant special attention.

First, it should be acknowledged that the EC's recognition of digital technologies as critical enablers of sustainability goals carries significant implications for MNEs and IBP. Historically, policymakers, especially in the U.S., considered regulation of the technology sector as economically cumbersome and inhibitive to innovation. Self-regulation by market actors was thus preferred. Shoshanna Zuboff argues that the absence of government regulation in the digital sphere has led to the development of a perverse logic she calls "surveillance capitalism", which describes the practice of firms clandestinely collecting and analyzing vast amounts of personal data for targeted advertising and behavioral manipulation to boost profit (Zuboff, 2015, 2019). However, the plethora of regulatory proposals by the EC, spanning areas such as AI, data governance and cybersecurity, not to mention the 'twinning' of the green and digital transitions, coupled with the recent bills proposed in the U.S. Congress, signals the end of the self-regulation era. Given their considerable size and societal impacts, MNEs must proactively engage in the nonmarket environment to prevent substantial disruptions to their business operations. Specific actions include the sustained provision of reliable information to policymakers, close collaboration with international bodies and organizations, aiding in the development of scientifically backed standards and measurements, and participating in public-private initiatives.

Second, geopolitical considerations are resurfacing as a central policymaking concern. Increased concerns about national security following the war in Ukraine, and the ongoing tensions between China and Taiwan may herald new patterns of transnational trade and production. Particularly noteworthy is 'friend-shoring' phenomenon – deliberately sourcing goods and services from political allies sharing similar values, as outlined in the 2022 SFR (EC, 2022d). Similarly, 'onshoring' – repatriating supply chains back to national jurisdictions, and 'nearshoring' – concentrating supply chains in geographically proximate countries, are predicted to gain increasing relevance in certain industries (Deloitte, 2023). For MNEs, this could mean that policies will be implemented that discourage the import or export of particular products and services deemed central to national security . The intensification of government activities in digital sustainability hints at escalating international conflicts, as policymakers respond to (perceived) beggar-thy-neighbor policy regimes, even among geopolitical allies. This is evidenced by the recent diplomatic dispute between the U.S. and the EU regarding alleged protectionist measurements in the IRA. The geopolitical revival also compels MNEs to reconsider transnational knowledge exchange within their organization and across industries, especially as countries may prohibit their citizens from working abroad in industries deemed vital to national security, such as the semiconductor industry. These policies could significantly restrict the availability of high-quality human capital, affecting countries' comparative advantages.

Third, if future international trade and production patterns increasingly take shape through geopolitical strategic alliances, it raises critical questions regarding the unifying values of these alliances and their long-term consistency and stability. Political regime change can lead to countries abruptly shifting their societal value prioritization in public policy, for example placing independence and self-sufficiency above solidarity and cooperation. The year 2016, for instance, featured the withdrawal of the UK from the EU after 47 years, following the results of a national referendum, as well as the election of Donald Trump, whose administration and political agenda was often at odds with the EU, particularly on environmental policy. These developments demonstrate that international relations are complex and dynamic. Whether such shifts unravel or reinforce certain international institutions remains uncertain, but it is clear that geopolitical alliances are susceptible to change. Furthermore, MNEs are becoming increasingly invested in the 'public good', influencing their institutional environment beyond mere economic calculations (Scherer et al., 2016). This development highlights the growing (geo)political role of MNEs, especially in relation to what values will govern digital sustainability.

In addition, the developments in the IBP sectors of stimulating net zero technologies, critical raw materials and semiconductors present fruitful opportunities for impactful academic contributions. IB researchers could scrutinize the degree to which different companies and industries engage in ‘friend-shoring’ or ‘near-shoring’. Such research could yield valuable insights into shifting patterns of international production, policy effectiveness in instigating these shifts, and how policymakers navigate the trade-off between economic efficiency and geopolitical resilience. Similarly, another exciting area of exploration could be the impact of different policies in accelerating these trends, and how these policies interact with the unique characteristics of particular MNEs, including their business models and degree of internationalization.

Furthermore, one of the most important obstacles in governing digital sustainability is the absence of scientific definitions and measurements, which introduces a significant degree of randomness in systematic comparisons between the environmental net costs and benefits of digital technologies. As policymakers rely on businesses’ technical expertise to some degree, businesses will play a pivotal role in governing the digital and green transitions. IB research can elucidate the various ways firms contribute to this process, and how their distinct characteristics correspond to specific preferences pertaining to the substance of public policy. Another crucial question relates to the trade-offs between different sustainability objectives. For example, onshoring may stimulate domestic employment in certain sectors and environmental benefits due to shorter supply chains, but it could also lead to higher prices, undermining the purchasing power of citizens. Finally, the return of geopolitics also heightens the importance of corporate diplomacy (Li et al., 2022).

5.7. Conclusion

The contemporary global landscape foregrounds sustainability as a crucial aspect of national security. For many countries, the transition toward a green economy powered by renewable energy is motivated by their desire to reduce their reliance on foreign imports. This has been catalyzed by significant global incidents, such as the COVID-19 pandemic, the war in Ukraine and the ongoing tensions between China and Taiwan, all of which have exposed the hazards of (over)dependence on foreign suppliers in key strategic sectors.

Furthermore, the surge of digitalization, characterized by the adoption and integration of cutting-edge digital technologies such as AI, BDA, cloud computing and blockchain in the domains of business, government and civil society, has invigorated political discourse on the preservation of fundamental values and the attainment of sustainability objectives. The EU has signaled its intent to be a global leader in the digital and green ‘twin’ transition’. This has already led to significant EU policy developments in areas such as AI, data governance and platform intermediaries, which are expected to have global consequences due to the so-called ‘Brussels Effect’ (Bradford, 2020).

The EU, along with other large economies, are putting forward policies that expedite the transition towards a clean and circular economy. However, they are at odds with one another over protectionist elements in these policies, which might potentially violate WTO rules. Such conflicts exist even among nations with similar societal values and long-standing political alliances, such as the U.S. and EU. Moreover, the EC has proposed policies in the areas of critical raw materials and computer chips to diversify their supply chains and become less reliant on China and Russia as a trading partner. This policy shift is driven in part by the importance of semiconductors and raw materials in achieving the goals of the EU Green Deal, and the growing recognition of these items as national security concerns.

However, the journey towards sustainability is replete with contradictions and trade-offs, particularly concerning the role of digital technologies, which can have both positive and negative impacts (cf. Ciulli & Kolk, 2023). These complexities have profound implications for MNEs and IBP. They underline the importance of nonmarket strategies for firms, and indicate a shift in international trade and investment patterns towards alignment with geopolitical alliances.