

### Decisive but Forgotten: Germany's Missing Technological Zeitenwende

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# DGAP POLICY BRIEF

ACTION GROUP

**ZEITEN  
WENDE**

## Decisive but Forgotten Germany's Missing Technological Zeitenwende



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The digital technology transformation is a largely overlooked dimension of Zeitenwende. However, preserving national security, safeguarding core values enshrined in technology, ensuring access to critical technologies, and maintaining competitiveness need to be a policy priorities for Germany and Europe. All of these are integral elements of autonomy and sovereignty in a world increasingly characterized by great power rivalry. The looming policy decisions, however, will have divergent outcomes depending on the prevailing political paradigms:

- Europe needs to start with a proper analysis of the geopolitical context. At its heart is the question of whether Germany and Europe prepare for a zero polar, bipolar or multipolar world. Europe's ambition will largely depend on its assessment of the future international order.
- The general assessment needs to be followed by a technology-specific understanding of interdependent ecosystems. Germany and Europe need to acknowledge that the challenges largely diverge. This requires identifying criticality, risks, and conditions of market success or failure in concrete technology ecosystems.
- Only from such an assessment can a proper policy toolbox be developed. Regardless of analysis, Germany and Europe need to sort out public and private interaction to fully capitalize on the private sector's innovation power, as these players could support overarching security priorities with innovative technology in the digital sphere.

## MIND THE GAP: GERMANY'S ZEITENWENDE DISCOURSE AND ITS DIGITAL TECH POLICY

The transformative forces of digital technologies are undeniable. But discussions in parliaments, editorials, TV shows, and pubs across the continent help illustrate just how much disagreement there still is about how impactful and desirable the transformation is. This paper contends that the digital transformation presents a crucial juncture for Germany and Europe as they grapple with preserving national security, safeguarding core values, ensuring access to critical technologies, and maintaining competitiveness. All of these are integral elements of autonomy and sovereignty in a world increasingly characterized by great power rivalry. These technological policy decisions, however, will have divergent outcomes depending on the prevailing global political paradigm. The pertinent question remains: Are we veering towards bipolarity, multipolarity, or a world devoid of any discernible polarity? Reforming tech and digital policies in the future requires a comprehensive understanding of competing global visions – and their power dynamics.

Digital technologies increasingly penetrate all spheres of life. There are many examples illustrating the economic, political, security, and value implications of the technological transformation.<sup>1</sup> ChatGPT is only the latest example hinting at the *economic potential* of generative Artificial Intelligence (AI). More and more products need Information and Communication Technology (ICT) patents. While protecting intellectual property is necessary, licensing fees are also turning into a “global tax” on all kinds of innovation. The distribution of such royalties will have an increasing impact on national competitiveness. Competition and rivalry over carbon neutral and environmentally friendly (digital) technologies also adds complexity to the green transformation. Meanwhile, technical lock-in dependencies narrow the scope of the *political freedom* to act. Several African and Asian

countries already rely exclusively on Chinese enterprises for maintaining their critical digital infrastructure.<sup>2</sup> These states might think twice before going against core Chinese interests.

It is this mixture of economic, technological, and geopolitical concerns that underlies Europe's ambition to reduce strategic dependencies on China. This is particularly true in fields like semiconductors and critical minerals. Preventing cyberattacks is crucial for the *security* of societies in the 21st century. For example, Russia opened the Ukraine War with a satellite hack on Viasat, targeting Ukraine's communication infrastructure.<sup>3</sup> Apart from the exploitation of technical vulnerabilities, export controls for dual use items take center stage in political discussions.<sup>4</sup> The growing political interest in technical standardization reflects that technology is not *value neutral*. Setting standards also shapes political and societal norms. Whether a technology that is rolled out globally protects privacy is a seemingly technical choice with enormous ideological consequences.<sup>5</sup>

## Adapting rapidly transforming technology is European power projection

In light of the distributary, political security, and value implications, digital technology is a central arena of great power competition between the People's Republic of China (PRC) and the US. However, the con-

- 1 Tim Rühlig (ed.) (2022): Assessing China's digital power and its implications for the EU. Berlin: Digital Power China. Online at: [https://timruehlig.eu/ctf/assets/x93kiko5rt7L/4uiZoNQrRkni5KfuNDRBbx/fd52e3320cfe21e6b304ad31d81279d8/DPC-full\\_report-FINAL.pdf](https://timruehlig.eu/ctf/assets/x93kiko5rt7L/4uiZoNQrRkni5KfuNDRBbx/fd52e3320cfe21e6b304ad31d81279d8/DPC-full_report-FINAL.pdf), accessed 9 May 2023.
- 2 Tim Rühlig (2021): The shape of things to come. The race to control technical standardization. Beijing: European Union Chamber of Commerce in China. Online at: [https://static.europeanchamber.com.cn/upload/documents/documents/The\\_Shape\\_of\\_Things\\_to\\_Come\\_English\\_Final%5b966%5d.pdf](https://static.europeanchamber.com.cn/upload/documents/documents/The_Shape_of_Things_to_Come_English_Final%5b966%5d.pdf), accessed 9 May 2023.
- 3 Christopher Bing and Raphael Satter (2022): Hackers who crippled Viasat modems in Ukraine are still active- company official. Washington D.C.: Reuters. Online at <https://www.reuters.com/business/media-telecom/exclusive-hackers-who-crippled-viasat-modems-ukraine-are-still-active-company-2022-03-30>, accessed 22 May 2023.
- 4 For a new report discussing the political implications of critical technology and dual use, see Fägersten, B., Lovcalic, U., Lundborg Regnér, A., & Vashishtha, S. (2023). Controlling critical technology in an age of geo-economics: Actors, tools, and scenarios. UI Report No. 1, May, 2023., available at <https://www.ui.se/butiken/uis-publikationer/ui-report/2023/controlling-critical-technology-in-an-age-of-geo-economics-actors-tools-and-scenarios>
- 5 Tim Rühlig (2021): China, Europe and the new power competition over technical standards. Stockholm: The Swedish Institute of International Affairs. Online at: <https://www.ui.se/globalassets/ui.se-eng/publications/ui-publications/2021/ui-brief-no.-1-2021.pdf>, accessed 9 May 2023.

sequences of this rivalry reverberate throughout the entire state system. No actor, big or small, will remain unaffected, and every player must adapt to a new landscape of risks and opportunities. Adapting to rapidly transforming technology and digital fields is particularly crucial for state empowerment and the ability to project power both near and far. This is especially true for European states.

New geopolitical realities have given rise to a wide array of major German policy changes, which together form the *Zeitenwende*. But while the digital transformation's implications can in themselves be described as a *Zeitenwende*, technical change is virtually absent from the wider German discussion of the term. In abstract, German policymakers acknowledge the importance of digital technology, but it is hardly ever prioritized and seldom associated with *Zeitenwende*. The reason might well lie in a shortsighted focus on the immediate challenge from Russia's war of aggression against Ukraine, characterized by a surprising lack of technological sophistication on Russia's side. However, technology takes center stage if *Zeitenwende* is understood more broadly as adapting to a world in which interstate war is thinkable again and great power rivalry ever present. This is also a world characterized by a lack of rules and order, and in which interdependencies do not guarantee a peaceful solution to conflicts.<sup>6</sup>

This paper examines this perspective and strives to spell out what it implies for Germany's *Zeitenwende*. It focuses on the digital transformation's external dimension and does not cover domestic tasks ranging from digitalizing public administration to fixing the lack of sufficient digital infrastructure in the country.

### MULTIPLE OPEN STRATEGIC AUTONOMIES: MANY POLICIES ARE NEEDED

One might argue that *Open Strategic Autonomy* is to technology what *Zeitenwende* is to European defense and security. Indeed, *Open Strategic Autonomy* captures the geopolitical turn of technology and holds that Europe should reduce strategic dependencies. Otherwise, the EU could be confronted with a far deeper, more complex, and even more painful need to disentangle from a geopolitical rival in situations of escalated crisis or war.

However, Europe has by no means come anywhere close to a common understanding of what actually is. For starters, even the term is contested. While some simply speak of Strategic Autonomy, others insist that the "Open" is capturing Europe's continued

*Strategic Autonomy  
is about supply  
chain resilience,  
national security,  
protection of  
basic values,  
and preserving  
competitiveness.*

commitment to trade and open markets as well as against protectionism. Germany's federal government largely avoids the term altogether and rather speaks of "digital sovereignty." This is to better reflect that the European goal is to maintain the *ability to act freely* and not be constrained by overreliance on digital technologies from a single source. Hence, (*Open*) *Strategic Autonomy* and *digital sovereignty* are both about reducing strategic dependencies rather than decoupling.

But what Europe needs to maintain such freedom remains contested and, in many cases, vague. At its surface, Europeans controversially discuss whether reshoring production of critical technologies, diversifying supply chains, or sourcing from geopolitical allies ("friendshoring") serves the EU best. What is really necessary, however, is a clear *operationalization* of (*Open*) *Strategic Autonomy* (and by extension *digital sovereignty*). Such an operationalization should start from an acknowledgment that (*Open*) *Strategic Autonomy* is an umbrella term for at least four distinct policy goals, namely supply chain resilience, national

<sup>6</sup> As such, *Zeitenwende* is both the description of the changing world around us and describes the aspiration to adapt to it.

security, protecting basic values,<sup>7</sup> and preserving competitiveness.<sup>8</sup> These four dimensions equally represent different types of risks that the EU should consider in its new approach towards China. European Commission President von der Leyen has characterized this approach as one that focuses on “de-risking.”<sup>9</sup>

**Global supply chain resilience:** The global value chains of many, if not all, emerging and foundational technologies are characterized by a transnational division of labor. No region is in control of all production steps or supplier markets. Thus, to strengthen security of supply it might be in Europe’s best interests to strengthen the resilience of global supply chains. This will reduce second- and third-order negative impacts on European industries in supply disruption events.

**National security:** Not reducing strategic dependency or losing strategic capacity might have (in)direct negative impacts on European member states’ national security. Backdoors in critical digital infrastructure are a widely discussed phenomenon. However, national security risks that stem from dependence on Chinese mobile network equipment vendors are different from the national security risks to member states that rely heavily on drones, surveillance cameras, or AI chips from Chinese vendors.

**Values and sustainability:** Strategic dependency or technological cooperation can also conflict with European values. Like implementing export restrictions to protect human rights, strategic dependence can also be scrutinized according to the human rights violations that such technology would enable. Similarly, sustainability is of growing concern, and emerging and foundational technologies play an increasingly important role. While both Europe and China emphasize its importance, the priority attributed and approaches to sustainability vary, which has implications far beyond the EU for global goods such as combating climate change.

**Competitiveness:** Europe might invest in strategic capacities or try to reduce strategic dependencies, in order to compete internationally if a certain technology or market is deemed highly important in the future. In light of the intensifying US-China technological rivalry, government incentives to support the technological competitiveness of a specific domestic industry or technology provider can also be motivated by maintaining “strategic indispensability.” That is to say, ensuring that a company continues to play an indispensable role within global supply chains over the long term.<sup>10</sup> Technological competitiveness therefore creates geopolitical leverage, both in relation to adversarial actors and partners. Strikingly, European competitiveness is mainly constrained not by innovation, but by a lack of scaling effects, coming from inappropriate fund allocation through financial markets. The result is an effective transfer of intellectual property from Europe to the countries that provide the necessary financial means to put them at scale. This is primarily, but not exclusively, the US.

All four policy goals associated with *(Open) Strategic Autonomy* are laudable, but they do not always go together, nor do the same policy instruments achieve them. In a new report, the Digital Power China (DPC) research consortium consisting of engineers and China scholars analyzed this phenomenon.<sup>11</sup> Increasing the resilience of supply chains requires diversification. In many cases, transparency measures are a necessary first step to get to a proper risk assessment. Procurement and free trade agreements are among those instruments that can incentivize diversification. Protecting indispensable technologies adds to European supply chain resilience.

The national security implications in this field mainly concern technical and vendor trustworthiness. To increase technical trustworthiness, adequate tools normally range from regulation to standardization and certification. Vendor trustworthiness is often closely associated with like-minded sourcing.

7 Basic values refer to normative policy priorities of the European Union such as a defense of human rights or sustainability goals. Particularly prominent in the digital technology domain is the issue of privacy.

8 Jan-Peter Kleinhans and Tim Rühlig (2023): Introduction: European Open Strategic Autonomy in the light of China’s digital tech power, in: Tim Rühlig (ed.): Europe’s strategic technology autonomy from China – assessing foundational and emerging technologies. Berlin: Digital Power China, pp. 12–26. Online at [https://timruehlig.eu/ctf/assets/x93kiko5rt7l/2kCX6IXU6CWJDPBkjaPnmF/eacc44fd42b9086dd898fdef7bc12965/DPC\\_-2023\\_-final.pdf](https://timruehlig.eu/ctf/assets/x93kiko5rt7l/2kCX6IXU6CWJDPBkjaPnmF/eacc44fd42b9086dd898fdef7bc12965/DPC_-2023_-final.pdf), accessed 9 May 2023.

9 European Commission (2023): Speech by President von der Leyen on EU-China relations to the Mercator Institute for China Studies and the European Policy Centre. Brussels: European Commission. Online at [https://ec.europa.eu/commission/presscorner/detail/en/speech\\_23\\_2063](https://ec.europa.eu/commission/presscorner/detail/en/speech_23_2063), accessed 22 May 2023.

10 Hideki Uno, “Japanese Semiconductor Industrial Policymaking in the Twenty-First Century”, Center for Strategic and International Studies, Washington, DC, 19 September 2022, <https://www.csis.org/blogs/perspectives-innovation/japanese-semiconductor-industrial-policymaking-twenty-first-century>.

11 Tim Rühlig (Ed.) (2023): Europe’s strategic technology autonomy from China – assessing foundational and emerging technologies. Berlin: Digital Power China. Online at [https://timruehlig.eu/ctf/assets/x93kiko5rt7l/2kCX6IXU6CWJDPBkjaPnmF/eacc44fd42b9086dd898fdef7bc12965/DPC\\_-2023\\_-final.pdf](https://timruehlig.eu/ctf/assets/x93kiko5rt7l/2kCX6IXU6CWJDPBkjaPnmF/eacc44fd42b9086dd898fdef7bc12965/DPC_-2023_-final.pdf), accessed 9 May 2023.

Policy instruments which defend basic values and promote sustainability often focus on like-minded coordination and coalition building. Only by acting in concert is it possible for Europe to incentivize third actors to adopt technologies that reflect fundamental values.<sup>12</sup>

Competitiveness, finally, focuses on strengthening the innovation and industrial base at home. Targeted industrial policy, investment in research and development, as well as the protection of indispensable technologies are crucial. Since the EU possesses the necessary wealth, but lacks the financial market instruments to turn innovation at scale into invention, cooperation with UK and Swiss capital markets could be particularly beneficial.

The urgency with which the EU should strive for one of the four policy goals of *(Open) Strategic Autonomy*, rather than prioritizing another goal varies significantly across technology fields. This implies that the concept of *(Open) Strategic Autonomy* is considered helpful, as it captures the need to react to the geopolitics of technology. But the term's usefulness ends where it does not differentiate between the four distinct policy goals. There is simply not a one size-fits-all solution to achieve *(Open) Strategic Autonomy*. We are instead talking about several "autonomies" as if they were one.

## ZEITENWENDE IN DIGITAL AND TECH: DEFINING EUROPE'S AMBITIONS

For Germany to navigate these largely unknown waters, it should strive for a common European understanding of the EU's ambitions. Ideal typically, we distinguish three ambitions based on three different scenario expectations.

The *first* scenario assumes a world shaped by the absence of order and predictability as all major powers lose the ability to prevent unexpected major interruptions to economic and security orders. In such a case of zero polarity, Europe needs to focus on getting as close to self-reliance as possible in fields that are essential to providing basic goods to its population. This mostly inward-looking perspective tends to prioritize national security over the other three policy goals associated with *(Open) Strategic*

*Autonomy* because – as the Ukraine War reminds us – security is the most fundamental of all public goods a state strives to provide. Modernization of the defense sector, as well as strict export controls to prevent the misuse of dual use technologies take center stage in this largely defensive ambition.

However, as the Ukraine War has also confirmed, security is not simply physical safety, but also economic security. Hence, a secondary European goal in this scenario is to reduce economic and technological dependencies wherever possible. As the world is shaped by uncertainty and powerlessness of all actors, active industrial policymaking strives for self-reliance in strategic fields for the functioning of European societies. In these fields, not even growing supply chain resilience provides enough reassurance. Defending values no longer plays a major role.

The advantage of this ambition is that it is as risk averse as possible, because it is based on the assumption of unpredictability. However, this scenario has two shortcomings. It requires enormous state intervention, since a wide array of digital technologies are needed for well-functioning societies. Alternatively, to avoid such failure, "basic goods" can be mostly reduced to the defense sector. While this limits state intervention, it neglects that security in the 21st century can hardly be assured without economic security. In other words, the dilemma underlying this scenario is how broadly it defines the "public goods" that the EU and its member states want to provide in a self-reliant way.

The *second* scenario starts out with assuming a bipolar world, in which the European Union and its member states closely align with the United States. Under these conditions, Europe adopts the lens of systemic rivalry. Europe's ambition is not to reduce strategic technology dependencies from all actors, but from geopolitical rivals, most prominently the PRC. Instead of de-globalization, the EU strives for a de-Sinification of its supply chains. This entails a different notion of economic security compared to the first scenario.

Accordingly, European supply chain resilience concerns focus on friendshoring. This is also part of Europe's national security strategy within the North Atlantic Treaty Organization (NATO). Protecting democracy and human rights is crucial, as it is an

<sup>12</sup> Ibid.



important underlying principle of the alliance with the US. European competitiveness in isolation is not at the core of this concern. Rather, international partnerships with like-minded allies form the center of Europe's strategy.

This ambition's advantage is that it is more realistic to face these enormous challenges while in close alignment with allies and partners that have a stronger footprint in digital technology. It requires fewer resources and less European protectionism. However, to the extent that Europe is "borrowing" technology from its partners, it gives up independent agency and turns into a follower of US leadership. For example, Europe would most likely join the US technology containment strategy vis-à-vis China. At the moment, EU export controls predominantly focus on national security concerns (even though the definition of national security is broadening). In this scenario, the EU would be forced to join the US in using chokepoints for offensive purposes. These would strive to actively restrain Chinese technological capabilities. Such a drastic change in course would come with economic and innovation costs. Not only would EU-China trade suffer considerably, but the price for sourcing technology is likely to rise while the expected value of innovation decreases. Intensifying long-term trade among democracies will only mitigate part of the short-term costs.

The *third* scenario, finally, strives to develop Europe as an autonomous pole in a world shaped by multipolarity. While this scenario shares a proactive ambition with the second one, it does not count on the transatlantic alliance. It instead aims to develop European technological strength in itself and through its own partnerships.

Accordingly, this scenario treats European competitiveness for the sake of becoming technologically indispensable to other actors, including both the United States and China. The goal is not self-reliance. Instead, supply chain diversification is to increase European resilience. Also, active industrial policy is regarded as a cornerstone. As such, this third scenario employs yet another understanding of economic security. This is more independent from the US than in the second scenario, and more proactive and comprehensive than the first scenario. To the extent that the transatlantic alliance is being weakened and NATO is replaced by EU capabilities, which would be a long process, if realistic at all, national security challenges need to be met by sourcing from European vendors. In a multipolar world,

Europe accepts that it is not able to spread its values, but focuses on its protection within the EU.

The advantage of this ambition is that it strives to maintain European agency. The EU would also be less dependent on domestic developments within the US, such as Donald Trump getting a potential second presidency. Importantly, this scenario best grasps the existence of interdependencies for the foreseeable future and strives to proactively build indispensability and chokepoints.

However, the risks are also high. In light of European technological weaknesses, the feasibility of this ambition is doubtful. At worst, Europe could weaken the transatlantic alliance and abet the rise of China while failing to establish the EU as one of several powerhouses. Another major challenge is that this policy requires enormous state interference with market distortion. This is likely to favor incumbents while hampering innovation.

As these three scenarios and their associated levels of ambition illustrate, all options have advantages and disadvantages. Also, they are based on diverging assessments of global affairs. But an adequate European policy does not only depend on what polarity assessment of the international system turns out to be correct. Instead, the three options are ideal types that can be somewhat combined. In purity, none are likely to be a promising basis for European policy.

For example, even in a world shaped by zero polarity and chaos, the EU does not need to go it alone, but can still opt for some form of alignment with the US. Conversely, even in a bipolar world, the extent of the transatlantic alliance is still to be determined. This would somewhat mix scenarios one and two.

Similarly, the analytical starting point of a world without poles serving as centers of power gravity can be combined with a more proactive policy that may not equate to a multipolar vision. This is likelier if economic security is considered essential in scenario one. Conversely, even if the EU strives to become a pole in a multipolar world, the exact degree of its ambitions is still to be determined. This describes how scenarios one and three could be combined.

Finally, in a bipolar world, the EU can strive for more agency, even if it remains strongly committed to the transatlantic alliance. This requires its ambitions to be backed up with more technological capabilities. In a more contested digital and technological world,

the ability to innovate, produce, and export critical technologies, applications, and raw material will offer leverage that can be used to craft cooperative outcomes. Conversely, in a multipolar world, the EU could align closer with like-minded partners, including the US. This roughly sketches out how scenarios two and three could be mixed.

Strikingly, however, a proper analysis of Europe's relations with the United States is a cornerstone of any promising technology *Zeitenwende*.

## Zeitenwende needs an analysis of Europe's tech relations with the United States

### POLICY RECOMMENDATIONS

Germany cannot put in place a *Zeitenwende* in digital and technology alone. Any such approach needs to be European. However, Germany can play a central and constructive role in developing such an EU approach. For this to happen, Germany should initiate a discussion and take a stance on at least three unresolved sets of questions.

*Firstly*, it requires a proper geopolitical analysis, including but not limited to a polarity assessment. While reforms need to start now, Europe's ambitions must be calibrated and adjusted to the over-arching power shifts and structural realities that will develop in the coming decades.

*Secondly*, the general assessment needs to be followed by a technology-specific understanding of interdependent ecosystems. Following from the four dimensions of (*Open*) *Strategic Autonomy*, policy-makers should assess risks in specific technologies.

Only technical and market expertise will help identify criticality, risks, and conditions of market success or failure.

*Thirdly*, from the geopolitical analysis and the risk assessment, a discussion on a proper policy toolbox follows. On a general level, a more developed common European market for tech and innovation, and finance linked to this, would serve common European interests regardless of the scenarios above. It would increase Europe's ability to withstand a more isolated future while allowing Europe to benefit from a more cooperative scenario. A recent report provides some first indications on what policy development could happen in more specific tech fields.<sup>13</sup> Regarding defense innovation, Germany and European states would benefit from a system that is more accommodating to small and new entrants. This might require new formats for public and private interaction to fully capitalize on the private sector's innovation power, as these players could support overarching security priorities with innovative technology in the digital sphere.

Europe needs to get up to speed. At the same time, this comes with trade-offs as it cannot properly rule out risks if decisions are taken too quickly. The baseline for such an approach is that Germany and the EU provide the necessary resources for a proper analysis and set up an institutional setting to support it. The US Chips Act sets aside 2 percent of its resources for government capacity building. If the EU and Germany adopted the same approach but reserved only 0.1 percent of the resources allocated for technology initiatives to government capacity building, technology initiatives, it would already multiply existing resources in government agencies. Such bureaucratic capacities should then be combined with multi-stakeholder forums to assist Europe and Germany in mastering the digital and tech *Zeitenwende*. These measures can at least help by mitigating the risks of an urgently needed, speedy *Zeitenwende* in the technology sector.

<sup>13</sup> Fägersten, Björn, 2023. Navigating the Euro-Atlantic defence innovation landscape. Politea report. Available at <https://politea.se/new-politea-report-on-euro-atlantic-defence-innovation>





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## ABOUT THE PROJECT

The project “Action Group Zeitenwende” cultivates the comprehensive yet coherent approach that Germany needs to better define, express, and pursue its own interests as well as the goals and values it shares with its partners. It helps build a Germany that is ready, willing, and able to act.

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