Research, innovation, and technology policy in times of geopolitical competition
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INTRODUCTION

We are living in an age of disruption. Politically, with rising geo-political tensions reflecting a new multilateral political order in which the US and China have embarked on a global competition for high-tech dominance while at the same time Europe has been suddenly reminded of its energy fossil fuel dependency on Russia following the Russian invasion of Ukraine. Environmentally, with unsustainable global development paths resulting in out-of-control climate change and declining biodiversity, increasing rapidly the costs of climate adaptation and mitigation and putting boundaries on material consumption. And finally, we are witnessing a technological revolution. A new breed of AI technologies is emerging, fuelled by massive data sets larger than anything we have seen before. These advanced AIs can produce conversations that sound eerily human, write essays, and outperform humans in tests of creativity.

Such unprecedented technological advances combined with a new geopolitical context and the imperative to combat global challenges such as climate change and its consequences, are fundamentally changing our world. Furthermore, they are occurring at a pace and level of complexity that challenges decision-makers and governance systems in general, particularly in mature democracies.

Disruption brings with it instability – political, economic, social – and increases the risks for crises and conflicts, between and within countries and in the case of the European Union between its Member States. For the EU, the institution that received just 10 years ago the Nobel Peace prize for having illustrated how openness in trade and economic integration amongst European nations would not just bring economic growth and welfare but also peace, this represents a fundamental threat. Openness in the trade of goods but also of services, of capital and labour, and ultimately of knowledge has been the basis of intra-European integration. It became an intrinsic part of European values of democracy and transparency towards the outside world with the EU championing the notion of “open science”.

Now quite suddenly, the EU’s vision of “openness” is being challenged. A need for a different, more “realistic” approach has emerged recognizing in the first instance Europe’s international positioning in a geopolitical competition over core technologies and in the second instance, suggesting that Europe should strive towards a position of “open strategic autonomy” and “technological sovereignty”.

1. A need for redesigning Europe’s research, innovation, and technology policy?

The notion of “open strategic autonomy” was introduced in the European policy debate well before the Russian invasion of Ukraine. It stemmed from the acknowledgement that the EU had been confronted with the consequences of two global crises: the financial subprime crisis starting in the US leading nearly to the collapse of the EU’s common currency and pushing most of the European countries into a “great recession”; and the global pandemic health crisis, bringing to the fore Europe’s critical dependency on foreign medical and other essential materials’ supplies. Yet, and as illustrated in the European Commission document introducing the notion of open strategic autonomy, the emphasis remained on the notion of “open”. To quote from the 2021 document: “Open strategic autonomy emphasizes the EU’s ability to make its own choices and shape the world around it through leadership and engagement, reflecting its strategic interests and values. It reflects the EU’s fundamental belief that addressing today’s challenges requires more rather than less global cooperation. It further
signifies that the EU continues to reap the benefits of international opportunities, while assertively defending its interests, protecting the EU’s economy from unfair trade practices, and ensuring a level playing field. Finally, it implies supporting domestic policies to strengthen the EU’s economy and to help position it as a global leader in pursuit of a reformed rules-based system of global trade governance.”

The question ESIR wishes to address here is how this notion of “openness” can be maintained as a core characteristic of European values – one closely connected to a way of life in which the freedom of thought, of expression and experimentation is considered essential. How can such an admittedly idealized European way of life picture be maintained in the new geo-political world? To what extent does the Russian invasion of Ukraine represent primarily a military security crisis, highlighting on the one hand EU’s military dependency on the US, and on the other, its energy dependency on Russian fossil fuels, triggering efforts to strengthen strategic autonomy and technological sovereignty?

More specifically with respect to research, innovation and technology, to what extent can Europe keep pace with the US and China in terms of the development and deployment of new technologies, innovation and investment? There have been critical moments in the past, such as at the start of this Millennium with the Lisbon strategy, when Europe expressed a clear voluntary commitment to invest in new technologies aiming at both sustainable economic growth and better jobs with more social cohesion. Ultimately the Lisbon strategy failed because its implementation conditions were too soft. Today, it will be essential to set more concrete objectives regarding the investment in research, innovation and education and in the development and uptake of new technologies. This will be vital in assuring not only Europe’s future wellbeing but also its ability to contribute to a world order that is built upon the principles of the UN Declaration of Human Rights, the Brundtland report and Agenda 2030.

2. Different rationales for openness require different levels of both de-risking and risk-taking

The European strategy on openness builds on various rationales for openness. They include strengthening economic competitiveness, responding to global challenges, meeting the demographic and educational challenges of human resources, and promoting political trust


2 Recent analyses indicate that the EU is falling behind the US and China when it comes to the mastery of complex technologies (Girolamo et al 2023). The global position of the EU in complex technologies-KIBD23002ENN.pdf.

3 Its aim was to make the EU "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion", by 2010.

4 A commitment to invest 3% of each country’s GDP in R&D as agreed in Barcelona in 2002.

and dialogue.⁶ All of these rationales link European self-interests to global interests of other countries and regions. In the wake of the war in the Ukraine and the new geopolitical challenges, concerns over strategic dependencies – in terms of trade and investment but also science and technology – have grown. More recently, in the context of a European China strategy⁷, the notion of “economic security” and “de-risking” have been put forward.

While de-risking can be a reasonable approach for reducing problematic dependencies in certain areas and on certain countries or regions and for pre-empting potential threats to national security, protecting European values and way of life will also require a willingness to take calculated, responsible risks. ESIR sees the need to more clearly spell out what the different rationales for openness and cooperation mean for different elements of both de-risking and risk-taking (see Table 1).

**Table 1: Rationales for global cooperation**

<table>
<thead>
<tr>
<th></th>
<th>Rationale for global cooperation</th>
<th>Elements of de-risking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science in general</td>
<td>Open Science Knowledge exchange Science diplomacy</td>
<td>Protection of confidential data</td>
</tr>
<tr>
<td>Technologies addressing global challenges</td>
<td>Sharing knowledge about technology and policy options Enhancing global Science, Technology and Innovation (STI)l capacities Providing technologies worldwide and working towards global standards</td>
<td>Avoid strong dependencies of key technologies</td>
</tr>
<tr>
<td>EU competitiveness in general economic goods and services</td>
<td>Augmenting the strength and facilitating international access of European economy Ensure advantages of division of labour</td>
<td>Avoid strong dependencies in key enabling technologies and strategic resources</td>
</tr>
<tr>
<td>Goods and knowledge with national security concern</td>
<td>Understanding and addressing security concerns</td>
<td>Decoupling from actors and regions in relevant activities and areas</td>
</tr>
</tbody>
</table>

Linking the different rationales to openess to the different elements of science and innovation shows that risk-taking, or de-risking, are not uniform concepts, but require different levels and levers, as follows:

- **Science in general** should follow an open cooperation mode, which fosters knowledge exchange and builds trust. In particular, the new geopolitical challenges increase the need for initiatives to foster science cooperation from the perspective of science diplomacy. De-risking applies to protection of confidential data, while risk-taking involves having the courage to engage or maintain certain collaborations which are not risk-free but which could be essential for the mastery of core technologies, the development of technological solutions to pressing challenges, such as climate change and pandemics, and to keeping abreast of state-of-the art knowledge. Engaging in such collaborations requires effective

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mechanisms for handling risk (e.g., governmental or other advisory and support structures), which are currently lacking.

- Addressing global challenges, such as climate change or pandemic diseases, requires global cooperation per se. Cooperation in this field also has to account for global responsibilities and climate justice. A key challenge for climate mitigation is the fast upscaling of technologies to bring costs down and adoption up. This involves sharing technology and policy options, enhancing global Science, Technology, and Innovation (STI) capacities and providing technologies worldwide, working towards global standards and also seizing opportunities of international division of labor. Elements of de-risking apply in this field mainly avoiding strong dependencies in key climate or health technologies. 8

- The competitiveness of the EU in general economic goods and services also involves openness. On the one hand, openness offers a means of augmenting the strength and facilitating international access of the European economy, and ensures that Europe can utilize the advantages of division of labor. On the other hand, openness is also required for the success of European exports. Elements of de-risking apply here to avoiding strong dependencies of both key enabling technologies and export markets. Garcia Herrero (2023) proposes ‘coordinated specialization’ – in which the EU pools resources with like-minded countries – for example regarding access to critical raw materials and regarding decarbonization – as well as working more with interregional and bilateral trade and investments agreements. 9 This later point is also raised by Federico Steinberg and Guntram Wolff in their paper from September 16th, 2023 "Dealing with Europe’s Economic (In-)security", written for the informal ECOFIN meeting in Santiago de Compostela, Spain. 10

- At the same time, the European Commission is in a unique position representing Europe as dominant, global trade player to introduce systematically principles of sustainability in international trade, such as the Carbon Border Adjustment Mechanism (CBAM) to be gradually introduced in October 2023, accelerating at the global level sustainable

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8 One example is European dependency on China for solar panels (Garcia Herrero (2023), China-EU roller-coaster relations: Where do we stand and what to do? Testimony provided for the Hearing of the US-China Economic and Security Review Commission "Europe, the United States, and Relations with China: Convergence or Divergence?", June 15. Alicia García-Herrero Testimony (uscc.gov)Alicia García-Herrero Testimony (uscc.gov)


10 They argue: "the EU should prioritize trade agreements with third countries in combination with investments from a more focused Global Gateway. Such agreements and investments create opportunities for diversification and would render the EU economy more resilient. Concluding ambitious trade agreements would also set the EU apart from the US, where concluding trade agreements is now politically rejected. Ratifying the Mercosur agreement rapidly would be particularly beneficial. In fact, the EU has a ready negotiated agreement with the Mercosur, which would give access to more than 260 million consumers, including by lowering tariffs substantially and increase the EU’s regulatory cloud. It would create the second biggest free trade zone including 770 million people, providing ample opportunities for diversification. Moreover, it would provide access to important critical raw materials. To conclude the agreement, the EU needs to accept Mercosur as an equal partner, become less demanding and be ready to open its market. The EU should also conclude additional trade agreements in Asia, including with India, ASEAN countries, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) or the Regional Comprehensive Economic Partnership (RCEP). Without a trade agreement, EU firms will be put at a disadvantage relative to firms serving the Asian market from China, given that China is a member of RCEP. This could in turn increase rather than decrease dependency on China."
economic models and environmental regeneration. This in turn will call forth new and different ways of thinking about access to resources, rights, transparency and traceability, and sustainable management, all of which reinforce the fact that openness gives us a greater chance of human survival.

- Goods and knowledge with EU security concern obviously need the most stringent form of de-risking, involving a decoupling, i.e., ending collaborations with and reducing dependencies on actors and regions in selected activities, areas, goods and resources. However, even in this domain, certain forms of openness are required, such as a mutual understanding of security concerns and related national strategies, which are indispensable in keeping a necessary level of trust even between systemic rivals.

- Finally, protecting Europe’s openness, agency and future prosperity and relevance, will require the willingness to invest in breakthrough research, technologies and innovation, not just with civilian competitiveness or sustainability aims in mind but also for military and economic security. Both in themselves involve a certain level of risk-taking, but particularly the latter is an area in which the EU has relatively little experience.

Implementing such a strategy of de-risking, and responsible risk-taking, faces various challenges. First of all, the different elements of STI are overlapping to a certain extent, most prominently with regard to the dual use problem of civilian and military use of the same technology. Second, the time horizon for which a strong dependency exists has to be differentiated. A short-term dependency, which can be mediated in the medium term, is less of a concern than a more deep-rooted dependency. Third, the general political orientation of the country on which the EU is highly dependent, matters, as does the stability of this orientation. Fourth, it is not sufficient to look at the level of the end-use product alone; it is also necessary to analyse dependency along the value chain up to raw materials, because bottlenecks at each level can be transferred to availability of the end-use technology (Figure 1).

Particularly, the fourth point calls for development of methodologies looking at the dependency at the level of knowledge base or production capability of a certain technology. For example, a climate mitigation technology, might appear to have no strong dependency, because the EU, in general, has strong capabilities in this segment. From the perspective of the value chain of a particular technology, however, a strong dependency might exist with regard to certain key components. If green technologies incorporate key digital components to a considerable extent, for example, there might be a high dependency on mining or manufacturing elsewhere even if the EU has strong knowledge base and production capabilities at the level of the green technology per se. Recent approaches on measuring technological dependencies and system-level strategic autonomy conclude that the EU is rather strong and more technology sovereign at green technologies, but weak and more dependent in digital technologies.11 But even if there is no dependency on the components level, a serious bottleneck might arrive at the level of critical raw materials defined by the EU. The situation becomes more complicated because it is necessary to perform such an analysis also for the value chain of imports from countries, which are considered as non-problematic with regard to technology dependency of the EU. ESIR sees a need for performing such an

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extended analysis of key technologies along the value chain to come up with a comprehensive and integrated input for STI policies.

Figure 1: Conceptual approach to link analysis at technology level with value-chain analysis and European raw material strategy

The debate about which sectors and technologies are of high risk and should be subject to specific industrial policies is also driven by the economic interest of the different sectors for receiving financial support. ESIR therefore sees the need to come up with clear criteria and a transparent analysis for defining a level of dependency, which justifies a more stringent policy for de-risking in particular sectors and technologies, and with criteria for specifying the conditions under which such a support is given.

3. Capitalism, Sustainability and Democracy

The unprecedented technological advances associated not only with AI but with so many other current scientific and technological breakthroughs offer the possibility of substantial normative change, for putting things right: for people, planet and prosperity. The current surge of technology presents both opportunities and risks for humanity and for the planet. It also partially explains the rising geopolitical tensions between China and the US since the mastery of core technologies has historically unprecedented implications for economic, military and political power.

At the same time, the tensions are also about an existential struggle between democracy and authoritarianism, a struggle which is particularly poignant given that democracy has been on the retreat for the past 17 years. Authoritarian countries account for a rapidly increasing

12 The comparison to Schumpeter’s 1942 seminal work Capitalism, Socialism and Democracy is made in https://policylabs.frontiersin.org/content/commentary-transformative-industrial-policy-in-europe-through-a-schumpeterian-looking-glass-capitalism-sustainability-and-democracy.
13 FIW_World_2023_DigtalPDF.pdf (freedomhouse.org)
share of global R&D investments, and they are using technologies to their political advantage. Thus, contrary to what many thought, digital technologies has helped rather than hindered the power of several authoritarian regimes, coining the term ‘techno-authoritarianism’. Mastery of disruptive technologies will therefore be critical to ensuring Europe’s future prosperity but also its sovereignty, international clout and ability to protect a world order.

Europe has so far managed to seize some of the opportunities presented by disruption by launching ambitious initiatives to combat climate change and to drive the transformation of industry, economy and society towards environmental sustainability. In contrast to other regions, it has done so while seeking to maintain social sustainability. However we cannot stop there. Europe needs a strategic, effective and enlightened research, innovation and technology policy to navigate this new world order. Such a policy should ensure our ability to harness and combine the forces of digitalization (and other emerging technologies), innovation, competition, stewardship and entrepreneurship for the benefit of society, international solidarity and our planet.

Such a policy should ensure that in line with the European Green Deal, Europe continues to reap the benefits of technology for competitive sustainability. However, it should start from the premise that Europe invests in research, innovation and technology so as to establish the necessary European and global frameworks and institutions for a sustainable future instead of falling into old traps, such as creeping protectionism, isolationism or government overreach.

4. New priorities for European science, research, and technology policy: recommendations

On science, Europe should continue to make competitive use of its European values of democracy and freedom. These values will continue to make Europe a more attractive place in the “competition for talent” than autocratic regimes. This also holds, we would argue, for the ethical considerations surrounding responsible innovation and trustworthy AI. And even more so with respect to the dramatic global sustainability challenges linked to climate change and declining biodiversity. As recognized by the IPCC15, to address climate change and restore the environment, research, technology, and innovation depend, more than ever, on international cooperation and knowledge sharing, and thus on “open science”, “open access” and “open data” to speed up and deepen the societal and economic transformations urgently needed. Strong scientific consensus on the dangers of imminent climate change and a rapidly declining biodiversity is itself in need of continuous actualisation. Past evidence often no longer fits the simple linear extrapolations on the basis of which predictions were previously made. New feedback loops emerge that intensify interdependencies to a scale where observations deviate from predictions16. There is a need for new ways to communicate science, to form consensus in society on its implications, and for science to contribute to policy solutions requiring new, global, open, out-of-the-box input of scientists coming from different areas and from all over the world.17

14 China today publishes more scientific papers than any other country in the world. See https://www.economist.com/finance-and-economics/2022/03/19/globalisation-and-autocracy-are-locked-together-for-how-much-longer
16 See https://www.nature.com/articles/d41586-019-03595-0
At technology level, rather than serving technology, a European technology policy should first and foremost ensure that technology serves people and humanity. This includes combating monopolistic control of technology and data (as currently exhibited by large platform companies), putting in place international or supranational mechanisms for preventing the abuse of technology e.g. through codes of conduct, watchdogs, and promoting inclusive technological development18.

In seeking to promote competitive sustainability (implying both environmental and social sustainability), a European technology policy should consist of the following (among other things):

- **A European DARPA** (Defense Advanced Research Projects Agency) with an added sustainability dimension. DARPA has allowed the US to drive disruptive innovation and technology development that meet both national defense needs and benefit US economic growth (through commercial applications). China has pursued civil-military fusion for many years. For historical reasons, Europe has sought to keep civilian and military research and innovation systems apart19. Yet as illustrated in many new areas, such as space, public-private cooperation has accelerated technological advances20. In a time of increasing geopolitical tensions where our freedom and democracy are increasingly threatened, innovation, security and sustainability need to cross-fertilize and reinforce each other. This need is now also captured in NATO’s new strategic concept that combines the three areas in its recent strategy "Technology innovation for a greener defence"21. Europe can and should assume a leading position in linking defense, innovation and sustainability – *triple use* – for the benefit of national security and competitiveness.

- **A technology monitoring system**: To be able to seize the opportunities presented by emerging technologies and at the same time handle associated risks, Europe needs a systematic overview over its strengths and weaknesses22. Such technology monitoring, which is currently lacking, should include research and human capital but also an assessment of Europe’s ability to commercialize and apply technologies, particularly in international comparison. Technology monitoring would provide a knowledge-based tool for safeguarding Europe’s access to critical technologies and for preventing dangerous dependencies (on firms or countries). It would also enhance Europe’s ability to de-risk

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18 see also Acemoglu and Johnson (2023), *Power and Progress. Our Thousand-Year Struggle over Technology and Prosperity*.

19 The Treaty on European Union restricts the use of the EU budget for defence. EU action in the field of defence is limited to the common security and defence policy that is an external crisis management tool and not intended to be a collective European defence policy, encompassing for example a common definition of the threats. This constraint complicates the EU long-term planning for EU spending in the defence area. Thus, in the case of Horizon Europe, legislation stills *explicitly prohibits the use of research money for military applications. Hile the €7.9 billion European Defence Fund (EDF) was set up in 2021 and can be considered as a significant milestone for collaborative military R&D programmes across members states, the EU still lacks a longer-term strategy for the EDF. As the European Court of Auditors noticed in its Special Report* The Preparatory action on defence, "the Commission has not yet sufficiently addressed strategic issues in order for projects under the EDF to have their intended impact. PADR defence research projects do not, from the outset, include a plan specifying how research results will be dealt with at later stages, in terms of additional research, development, manufacturing, procurement, and other aspects." [https://www.eca.europa.eu/ECAPublications/SR-2023-10/SR-2023-10_EN.pdf](https://www.eca.europa.eu/ECAPublications/SR-2023-10/SR-2023-10_EN.pdf), p. 5.

20 This holds not just for the US but also for e.g the so-called Quadrilateral Security Dialogue of Australia, India, Japan and the US. The latter "Quad" is now developing into a platform for mutual security (see [https://isic-japan.org/event/commanding-heights/](https://isic-japan.org/event/commanding-heights/))

21 Perseverance amidst crisis: NATO’s ambitious climate change and security agenda after Madrid | European Leadership Network.

22 One example is the ‘Critical Technology Tracker’ developed by the Australian Strategic Policy Institute (ASPI)
international science and technology cooperation while avoiding undesirable decoupling and isolation.

- **With respect to science, research and technology, this implies the need to strengthen Europe’s science and technology assessment capabilities** across the EU institutions. It also implies broadening its scope to include more systematically aspects of foresight and resilience, bringing to the fore the EU’s need to address incomplete technological foresight and societal uncertainties. Apart from “assessing” such future trends, it is more important for strengthening futures literacy across European and other democratic societies with the aim to better sense and make sense of what is emerging in the present, discover multiple ways of understanding the world around us and embrace longtermism. At a more global level, the core question would be: how can one improve in democratic societies, the agile risk intelligence capabilities critical for its ability to make deliberate choices in a volatile, unstable and rapidly changing world?

- **Continuing to invest in strong science, innovation and education.** This is of course an essential counterpart to measures aimed at de-risking Europe’s interactions and relations with other countries and regions, and to addressing security concerns through protective measures. Only with world-leading science, technology and innovation can Europe secure its own future and that of the planet. We have addressed the critical issue of education and skills development in some of our earlier papers, eg “Industry 5.0 and the future of work” Innovation procurement is another powerful but so far woefully underused instrument for strengthening innovation, by shaping new markets and promoting the development of innovative SMEs.

- **Putting more efforts into promoting tech creation and adoption.** While Europe is in many areas a leader in science and research, it has significant weaknesses, particularly compared to the US but also China, when it comes to the uptake and diffusion of new technologies (both in the public and private sectors).

- **A strategic approach to AI** which ensures Europe’s ability to seize the opportunities presented by AI while also managing its risks (to integrity, security, ethics, sovereignty). Currently, one of the big risks for Europe is that AI is developed elsewhere (Balland and Renda 2023). This not only undermines Europe’s scientific, innovative and economic strength, but also reduces its influence on AI governance and regulation. Therefore, a massive-pan-European AI initiative is needed, with investments in skills development and research as well as suitable regulatory frameworks and governance. As a society based on open values of democracy and human rights, it also requires Europe to continue to play alongside other democratic societies a leading role in developing international structures and frameworks for “responsible innovation” with respect to the safe application of AI.

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23 Contrary to what happened in the US, where the Office of Technology Assessment was abolished (technically “de-funded”) in 1995 under the "Contract with America" period of Newt Gingrich’s Republican ascendency in Congress. (ESIR) 2023 Focus Paper, industry 5.0 and the future of work-KIBE23002ENN.pdf
25 Similar strategic approaches will also be needed in other technology areas.
• **An EU ‘mission’ on sustainable raw material and resource use.** One high risk area of particular concern to Europe is the possible supply disruption of particular critical raw materials. The European Critical Raw Materials (CRM) act, proposed by the EC in March 2023 and adopted by the Council in June 2023, contains also a provision to “support research and innovation on resource efficiency and the development of substitutes”. In this sense, the debate about the need for the CRM Act and the “discovery” of the EU’s raw material dependency runs in close parallel with the debate on “technology sovereignty”. The CRM Act highlights the fact that while the EU might have strong own technological competences in particular technologies, including those linked to renewables, from a value upstream position, it could be in a technology dependent situation, precisely because the technology requires CRM and as a result constitutes a supply risk. We propose to introduce a “Mission” within the future framework program on sustainable raw material and resource use. Such a mission would support the development of substitutes for those rare earths and critical raw materials where Europe is most vulnerable. In a certain way doing so will also give the concept of “mission” an additional political meaning: that one of de-risking Europe’s economic vulnerability on CRM. At the same time, it would put the emphasis on openness, partnership, local development, effective poly-centric governance of the commons and multi-level governance, all of which are essential in achieving and embedding a sustainable and transformative approach to rare earths, raw materials, mining in Europe, circularity and holistic, wellbeing based economic paradigms to bring about a different set of relationships between human use of resources, equitable and responsible access and planetary impact.

• **Strengthened European international engagement and leadership to promote the responsible and mutually beneficial use of technology** (e.g. through the Trade and Technology Council, NATO, the UN and other international and supranational bodies). Doing so, the EU in its revisited geopolitical collaborations strategy might pull back from certain partnerships along the lines it did before based on more equal partnerships – requesting e.g. similar openness and financial contributions – while strengthening collaborations based on its old principles of “open science, open innovation and open to the world” in its partnerships with the Global South. A good example can be found in the new joint African Union EU Innovation Agenda (July 2023) which supported by the Global Gateway29 will now represent for the next decade the mainstay of the cooperation on Science, Technology and Innovation between Africa and Europe. While the Agenda can only be welcomed, including today’s different short-, medium- and long-term actions focusing on four priority areas: Public Health, Green Transition, Innovation and Technology and Capacities for Science, implementation through the accompanying Roadmap will be crucial. The EU has a long history of toothless and failed initiatives with respect to the Global South: it will be crucial to make sure that the new Agenda and the accompanying Roadmap are regularly updated and open to new initiatives. For this reason, we would advocate that the Agenda is complemented with concrete initiatives, coupled with specific (measurable) objectives, for strengthening Africa’s ability to access and engage in the development of new technologies (e.g. through research and education partnerships, investment in infrastructure, joint technology projects, etc.)

• Geopolitical Debate: **recognize the geopolitical debate** between Europe, China, and the USA in building resilience when addressing future technological uncertainties. Europe

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should continue to be a stronghold, also in the area of science, research and technology policy, of “thick” as opposed to “phantom” democracy\textsuperscript{30}. Particularly in the context of the digitalization of society, it is important for Europe to remain a frontrunner in protecting and promoting its fundamental rights and values such as justice, equality and solidarity while also enabling its uptake and diffusion. Science, research and innovation can put those values, even unintentionally, under threat.\textsuperscript{31}

5. Conclusion

Openness in the trade of goods but also of services, of capital and labour, and ultimately of knowledge has been the basis of intra-European integration. It became an intrinsic part of European values of democracy and transparency towards the outside world with the EU defending the notion of “open science”. This European “openness” vision is being challenged and calls for adapting openness to reduce a growing catalogue of risks.

Based on the need to prepare, protect, and transform, ESIR has already underlined the need for transformation in the age of polycrisis.\textsuperscript{32} This focus paper of ESIR more specifically addresses the notion of “openness” in the new geo-political world. ESIR calls for a balanced approach of de-risking and responsible risk taking, which takes the different rationales for openness into account. Such a responsible risk taking is in the self-interest of Europe to tackle global challenges, to remain economically competitive, and to be able forge new geopolitical cooperation. In order to keep the risk taking responsible, we need a systemic approach to evaluate the risks, which links the different approaches to evaluate technological, economic and raw material dependency with the different rationales for openness and the different levels of risk. In order to prepare, protect and transform Europe, this also requires new priorities for European science, research and technology policy, to ensure that Europe continues to reap the benefits of technology for sustainable competitiveness in the era of global technological and economic competition.

\textsuperscript{30} As the European Group on Ethics in Science and New Technologies put it in their report on Democracy in the Digital Age: “Democracy is the form of government underpinned by, and best suited to protect, fundamental rights as well as the values that these defend and promote, such as justice, equality and solidarity. Such a rich understanding of democracy helps to prevent democracy from turning into a kind of “phantom democracy” (Boggs 2011, Keane 2017) that has the outer form of a democratic system but does not substantively incorporate the rule of the people and the protection of their interests. Our ‘thick’ conception implies that majority rule is not an end in itself. Instead, it serves the purpose of ensuring that as few people as possible live under a government that they have not elected (Kelsen 1920). Thus, the majority principle serves to realise and protect other substantive values and it is incomplete without the protection of minority rights. A thick conception of democracy also entails a civic consciousness of engagement and the recognition of social, political and economic equality in society.”, p.7. See European Commission, Directorate-General for Research and Innovation, European Group on Ethics in Science and New Technologies, Biller-Andorno, N., Céu Patrão Neves, M., Laukyte, M., et al., Opinion on democracy in the digital age, Publications Office of the European Union, 2023, https://data.europa.eu/doi/10.2777/078780

\textsuperscript{31} As highlighted by the EGE: “it is now more than ever necessary to understand privacy not just as a negative right to be free from unwarranted interference in one’s life, but also as a positive right, possessed by each of us, to develop and express our personality without being datafied or watched. To protect democracy in the digital age, we need not a thin, but a ‘thick’ conception of it. This demands that democracy be understood from an ethical perspective. It is not just a political regime but also comprises a set of values that shape human behavior and form the foundation of society. … It entails an understanding, on the part of everyone, that ‘we are in this society together’ – a sense of community and solidarity. Thick democracy thus requires more than the mere acceptance that others may end up benefitting more from widely shared principles of distributive justice. It requires civic solidarity and reciprocity that support just outcomes.”

We are at a critical juncture in human history and at a juncture where policy matters. Europe has a unique opportunity and responsibility to prove that democracy and international cooperation can harness the force of technology for people, planet and prosperity.
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In this publication, the ESIR group explores the research, innovation, and technology policy through the lens of geopolitical competition.

This focus paper emphasizes the importance of a European technology policy that supports sustainability, democracy, and responsible innovation. It calls for proactive investment in research and innovation to shape global frameworks.

In a rapidly changing world, Europe's position must be strengthened while making sure technology serves humanity and addresses environmental challenges.

Research and Innovation policy