

Strategic Dilemmas Related to Critical Raw Materials as the Engine of Digital Transition – The Power Relations of Brussels and the Beijing Effect

This study analyses digital policy, an important field for Hungary, as a member state holding the consecutive presidency of the Council of the European Union in the second half of 2024. The analysis draws particular attention to the imbalance in the global value chain of critical raw materials that represents a great challenge from the point of view of strategic sovereignty, but whose sustainability is essential for digital development. The study examines the major political tests of strength taking place along the Beijing–Brussels–Washington axis, comparing the Chinese dominance of raw material supply with the ever-growing European trends in raw material demand. In addition, the study examines EU legal acts and the Critical Raw Materials Strategy of the great powers using a case study methodology, by considering the question: What degree of exposure does the European Union have towards China in the procurement of critical raw materials, and what should the Union do in the future to strengthen its strategic sovereignty? The study concludes that 1. the development of digital technologies is highly dependent on critical raw materials; 2. the green and digital transition will drastically increase the demand for certain raw materials by 2050 at the European level; 3. the supply of many critical raw materials is highly concentrated, with 98% of Europe's imports of rare earth elements coming from China, an excessive dependence on a quasi-monopoly country which makes Europe vulnerable. Finally, 4. to reduce the latter trend, it is important to strengthen strategic partnerships and to find alternative raw materials, by stimulating innovative research.

Introduction

The present volume explores the policy areas that may represent the defining aspirations of the European Union in the second half of 2024. This study examines some of the queries arising around digital policy, which should be addressed by the Hungarian presidency of the Council of the European Union in 2024. While writing this study, the program of the EU Council presidency trio, consisting of France, the Czech Republic and Sweden, including the priorities of the Czech presidency, formed the basis of the digital policy discourse in the Union, together with the codification debates surrounding the legislative drafts presented by the European Commission. Regarding the latter, it is important to note, from the point of view of the Hungarian presidency in 2024, that the draft Artificial Intelligence Act (AI Act) submitted on 21 April 2021 is expected to be adopted in the second half of 2024. The strategic importance of the EU's digital policy is indisputable in this period, since the countries holding the presidency play a decisive role in the adoption of the draft legislation and can hinder, modify, or even speed up the adoption process.

It is therefore important to pursue a discourse on digital policy which also considers the current Council presidency, especially when this area is reflected in its major policies, due to which increasing resilience and strengthening Europe's strategic sovereignty become a basic condition for digital development. The relevance of strategic thinking is indicated by a statement made by Ursula von der Leyen, at the Strategic Forum held in Bled at the end of August 2022, in connection with the need for critical raw materials for digitalisation, noting that China dominates the market, and therefore that building strategic autonomy and diversifying partnerships is a priority in EU policy.¹ With the green and digital transition, the demand for raw materials increases, as, for example, lithium is needed for batteries, silicon for chips, and rare earth metals for the magnets that drive electric vehicles and wind turbines. The President of the Commission predicted that by 2030 the demand for raw materials for all these applications could double, and there could be a 40% increase in the annual demand for lithium between 2020–2025, with the mining and processing market also being dominated by China. Moreover, ten of the thirty critical raw materials come from China. All of this may foreshadow the development of a dependency similar to the reliance on Russian gas and oil, which causes intense political debates and economic exposure in Europe. The President of the Commission confirmed this in the State of the Union Speech held in the European Parliament on 14 September 2022. Von der Leyen's statement stressed the need to take rapid action, while at the same time she announced that the Commission would present its draft proposal on Critical Raw Materials to strengthen strategic autonomy in the first quarter of 2023.

When examining global dependency relations, the social and economic aspects underlying politics should also be borne in mind. Since the beginning of 2020, the world's struggle to tackle the Covid-19 epidemic has determined economic processes to this day, not to mention the Russian–Ukrainian conflict that broke out in early 2022. Discussing digital policy and within it the supply chain of critical raw materials is inevitable in connection with the EU presidency, since with the intensification of economic tensions, the competition in strategic sectors evolves, as can be seen in the study. Moreover, analysing the World Mineral Statistics also indicates that extreme shocks, such as pandemics or war, reduced global production of critical raw materials by two-thirds by 2020 compared to the levels of 2019.²

It is therefore understandable that interest is growing globally in how individual countries can secure the supply chain of critical minerals necessary for the high technology and energy transition. Above all, governments are trying to avoid falling into the same dependency trap that happened in connection with oil and gas in the twentieth century. The comparison is not accidental, as we are facing a similar trend that predicts an explosive increase in the demand for critical raw materials in the coming decades. In the EU, the United States, the United Kingdom and other Western countries, the

¹ European Commission 2022a.

² IDOINE et al. 2022.

creation of strategies and the development of policies responding to new challenges have begun. Both the private and public sectors are looking for new commercial opportunities in this area, opening up questions of recycling, research, processing and financing, with an increasing emphasis on diversified partnerships through multilateral diplomacy.

In addition to clarifying the concept of critical raw materials, in order to understand the ever-increasing demand for them, this study places the development of European digital policy in a broader geopolitical context, and evaluates the first two years of the European Digital Decade. After an overview of the codification and strategic processes, the global power relations system of the supply chains of critical raw materials necessary for digital development will be discussed, focusing on comparing the Brussels effect and the Beijing effect, which are two key examples of efforts to strengthen strategic autonomy. After a multi-faceted examination of sovereignty, the future of the Chinese-dominated critical raw material extraction industry will finally be addressed, i.e. initiatives aimed at resolving the exposure caused by the quasi-monopoly situation facing Europe will be discussed that can be traced in strategies and multilateral partnerships.

Europe's digital decade

The coronavirus epidemic and the war raging in Ukraine both drew heightened attention to the opportunities offered by digital development, accelerating its evolutionary process. Perhaps it is not too bold to say that during the pandemic, digitalisation can be considered to have emerged as the winner among European Union policies. In addition to its many positive effects, the dangers inherent in the digital space were also identified, which strengthened the codification ambitions of the institutions of the European Union and the member states aimed at creating a safe legal environment for users.

The EC president, elected as head of the European Commission in 2019, announced the European Digital Decade at the beginning of 2020 as one of her first tasks, and to achieve it she defined a series of digital development goals and ordered the necessary legal and financial instruments for their implementation. After that, the codification processes accelerated, resulting in the creation of rules providing protection in the digital space, the precursor of which was the General Data Protection Regulation (GDPR) in 2018. Since digitalisation is an area that develops almost uncontrollably quickly, it represents a major challenge for both national and EU legislators to ensure that the rules are sufficiently flexible, yet detailed. The rules, in addition to protecting their subjects, must be value-based, and it could even be considered the motto of Europe's Digital Decade that the EU wants to guarantee the same rights and obligations in the online space that its citizens enjoy offline. To achieve this, the values of transparency, reliability, predictability and human-centeredness are established as the key expectations when defining the ethical framework of digital technology. The expectation of the citizens is also expressed towards the legislators based on the 2021 Eurobarometer survey, since the

82% of respondents agree with the European Commission's intention to define digital rights and principles.³

It is often claimed that digital development brought a technological revolution in the second decade of the twenty-first century. It is inherent in revolutions, as with the industrial revolution two centuries ago, that in times of rapid development, the protection of people can only be ensured by prudent and proactive governance. The challenges of providing the desired protection in the digital space can also be compared to the example of the introduction of road transport. With forward-looking planning, the goal is to eliminate accidents before they occur, so it is necessary to introduce improvements corresponding to seat belts, airbags and other mechanical protective functions in the usage of digital devices. Continuing the analogy, similar to the rules defined for safe road traffic, frameworks of limits and principles to be applied in technological development must also be created. It is also necessary to place great emphasis on prevention in the digital space, because the violation of rights can often occur without the victim's knowledge, such as in cases of illegal data management, unfair digital market competition, or when technological developments are based on purely economic interests.

During the creation of the new digital regulatory framework, the pandemic turned out to be a driving force for the legislators. Of course, to claim that without the pandemic in 2020 digital policy would not have undergone a large-scale and progressive development would be an exaggeration, since the preparations were already in full swing in the years before that, and the scientific, social and political intentions had been formulated. In 2020, as a result of the common will and global competition, decisions were made to accelerate the development of the digital ecosystem and ensure the operation of the safe European Digital Single Market for citizens, transparent and financially supported for businesses and member states. On 19 February 2020, the Commission announced the Digital Europe Programme and the European Digital Strategy, to define the next steps in building a digital regulatory framework to lay the foundation for European innovation networks. In addition to the digital single market, the aim of the European digital regulatory framework is to reduce technological dependence, which has mainly emerged in relation to the United States and China. In 2020, the most significant digital policy initiatives at the EU level are the White Paper on Artificial Intelligence, the European Electronic Personal Identification System, the Digital Education Action Plan, the draft legislation on Data Governance, and the legislative packages on Digital Services and Digital Markets. The purpose of the drafts on Digital Services and Digital Markets is to regulate data platforms and the e-economy in such a way as to guarantee the security of digital information management for the creator of the data, and at the same time to create fair competition for service providers operating on the digital market. The latter also aims to eliminate the market abuses outlined in the chapter on the Beijing effect on the European market. In order to protect the cyberspace, the Cybersecurity Strategy was

³ Eurobarometer 2021.

also revised and a new strategy was announced in 2019, in which the creation of trust and security in the digital decade was given the main role.⁴

The digital codification processes that started in 2020 escalated further in 2021, making it clear that the EU institutions agree on the importance of regulating the digital space. The interinstitutional debates focus on consumer protection, building trust in technology, developing fair market mechanisms, creating digital connections and ensuring Europe's digital sovereignty. The importance of the latter is also reflected by the fact that the digital capacity of the European Union is surpassed by the United States and China, so Europe's opportunities to build and maintain its economic and political power will decrease in the digital future. The indicator measuring the development of the European Digital Economy and Society in 2021 also made it clear that in order to catch up and be competitive, the digital sovereignty of the continent and enhanced cooperation between the member states of the European Union are essential, since the European states alone, due to their size, are not able to compete with the aforementioned superpowers.⁵ Strengthening Europe's digital sovereignty therefore also increases the global economic position of the member states.

The discussion of European digital ambitions has been a theme of many EU summits, and at the request of the Council, it has culminated in the creation of the Digital Compass strategy put forward by the Commission, which lays down the milestones of Europe's Digital Decade until 2030, emphasising the importance of building transatlantic strategic relations.⁶ Although the compass does not directly address the raw material needs of digitalisation, it favours building partnerships to reduce exposure to China. In 2021, the Commission also launched the Artificial Intelligence legislative proposal that, as previously mentioned, is of particular importance from the point of view of the Hungarian presidency. Needless to say, the new legislative proposal on digital identity was added to the list of initiatives in 2021, and due to the global chip shortage since 2020, the European draft legislation on chips was presented on 8 February 2022. The EU aims to be a leader in the design and manufacture of next-generation microchips using transistors as small as 2 nanometers or smaller. The idea is ambitious, but it does not resolve the critical shortage of raw materials and the dependency situation. Ursula von der Leyen's 2022 SOTEU speech is important from the point of view of this study, as the President of the Commission announced that the draft legislation on Critical Raw Materials will be presented that also supports Europe's efforts to become the first climate-neutral continent, in addition to the intention to regulate the stable operation of supply chains and the provision of access to raw materials.

Since securing supply chains cannot be achieved by diversifying trade alone, a holistic approach is needed that can be fostered through the strategic use of critical raw materials and by building a network of European agencies, creating a more flexible supply chain while being focused on the whole process. It is an aggravating circumstance that Europe

⁴ PATÓ 2022: 44–48.

⁵ European Commission 2022b.

⁶ PATÓ 2021.

only has very small reserves of critical raw materials, so strategic reserves must be accumulated to smooth out market instability so that EU countries can share the benefits equally. The EU sees increased investment in recycling as key to ensuring the future supply necessary for the continent's needs.

From 1 January 2022, France took over the rotating presidency of the Council of the European Union from Slovenia, with digital priorities remaining at the top of the agenda, just as they were in the first half of 2021 for the Portuguese presidency, with the goal of strengthening Europe's role in the digital world economy. France, the Czech Republic and Sweden currently make up the presidency trio, which will be followed by the Spanish–Belgian–Hungarian trio starting in the second half of 2023. The program of the current trio focuses on creating the foundations of the European data sharing culture by strengthening European digital sovereignty, by creating common data spaces (European Health Data Space), and at the same time, seeking to reduce risks by developing the digital rule book.

The purpose of this study is not to examine the digital priorities of individual presidential programs. However, it is clear from the past that the issue of digital legislation will continue to be emphasised in the future and that strategic sovereignty is a pivotal point of the European agenda, so the Digital Decade of Europe also imposes obligations on the next presidencies.

European digital sovereignty

The previous section described how the European Union is trying to take the lead in terms of digital codification. In a technological market dominated by China and the United States, the EU had one option, it had to pursue legal competition to enable it to differentiate itself from its competitors in the international space, and even influence global value chains and market operations through legislation. The EU's role as a digital principle leader also determines its digital sovereignty strategy, but it must strive not to apply excessive protectionism and not to isolate Europe behind the bastions of law.

The lessons of market competition show that it is not possible to gain a large global advantage in strategic sectors by mere codification, so it is worth highlighting two other possibilities for building sovereignty in addition to legislation, namely strengthening the internal market with financial incentives and building strategic partnerships outside Europe. Building widespread economic relations in European digital technologies relieves the pressure of dependency, thus strengthening sovereignty. If the reform of legislation and the system of subsidies is considered to be an active approach to strengthening sovereignty, building external partnerships can be regarded as a passive way of building sovereignty, since the EU wishes to strengthen its strategic position by easing its dependency system.

Definition of critical raw materials

The draft legislation on critical raw materials will clarify which materials are considered critical. The definition of this category is constantly changing, because the supply chain, the dynamics and demand, as well as the strategic importance of individual raw materials can all vary, even as a result of geopolitical changes. According to the practice of the EU so far, critical raw materials are interpreted as those minerals that are of significant industrial and technological importance, but are of limited availability. The list of such materials, which has been changed from time to time since 2011, is maintained by the European Commission. Currently, thirty key minerals have been identified, including lithium, cobalt, platinum, tungsten and rare earth elements, for which demand is expected to skyrocket in the coming years.⁷ The list of critical raw materials was expanded to thirty in 2020, compared to 2011 when it contained only fourteen elements. Interestingly, the 2020 list includes bauxite, lithium, titanium and strontium for the first time, as its authors warn that demand for lithium in the EU is forecast to quadruple by 2050, while demand for rare earths will increase fivefold by 2030.⁸ The list is evolving, which does not mean it can only expand, as, for example, while helium remains a concern in terms of supply concentration, it was removed from the 2020 critical raw material list due to its declining economic importance. In the future, it is also possible that helium or nickel will return to the list of critical raw materials.

Table 1: The European Commission's list of Critical Raw Materials in 2020

2020 Critical Raw Materials (news as compared to 2017 in bold)		
Antimony	Hafnium	Phosphorus
Baryte	Heavy Rare Earth Elements	Scandium
Beryllium	Light Rare Earth Elements	Silicon metal
Bismuth	Indium	Tantalum
Borate	Magnesium	Tungsten
Cobalt	Natural Graphite	Vanadium
Coking Coal	Natural Rubber	Bauxite
Fluorspar	Niobium	Lithium
Gallium	Platinum Group Metals	Titanium
Germanium	Phosphate rock	Strontium

Source: European Commission 2020a

The demand for critical raw materials is on the rise in Europe's Digital Decade, mainly because achieving climate neutrality goals is becoming increasingly important for governments and businesses.⁹ In European digital policy, the term twin transition, i.e. green and digital transition, often appears as it is frequently claimed that a green transition cannot be achieved without digitalisation.

⁷ European Commission 2020a.

⁸ MCGUINNESS–OGRIN 2021.

⁹ United Nations Economic Commission for Europe s. a.

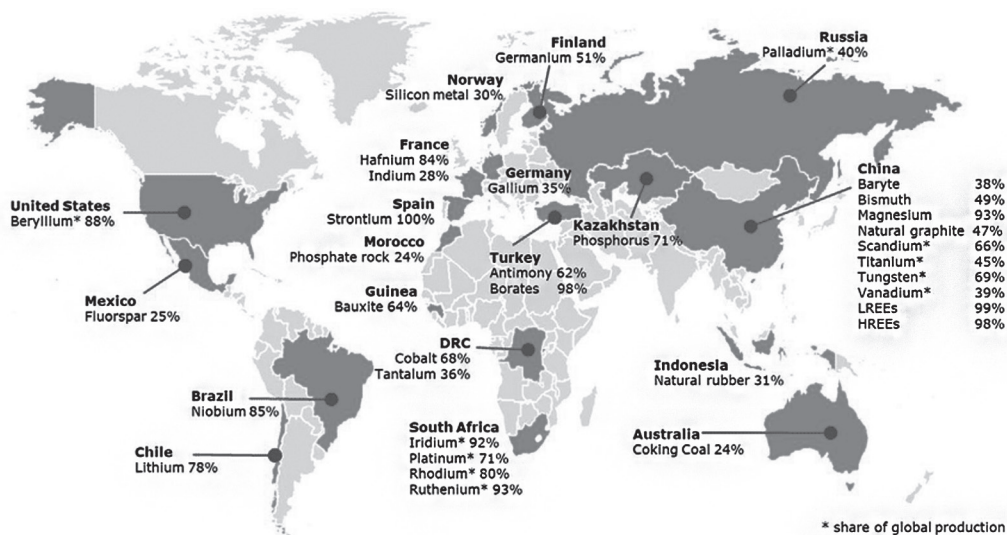


Figure 1: Largest suppliers of CRMs to the EU

Source: European Commission 2022

There are several reasons for the increased demand for critical raw materials. On the one hand, these minerals are indispensable in the production process of chips, electronic products, wind turbines, solar panels and electric vehicle batteries. On the other hand, the shift away from fossil fuels drives markets towards cleaner energy sources and is thus a key element in the green transition. However, the supply chain of critical raw materials faces many challenges because their extraction is clustered in observable hotspots around the globe. According to the World Bank, global demand for critical raw materials is expected to increase by 500% by 2050, resulting in sharp price increases and heightened supply risks in the short term.¹⁰

In addition to the European Union's definition of critical raw materials, the U.K.'s Critical Raw Materials Strategy, adopted in 2022, is also worth examining.¹¹ While modern economies rely on countless raw materials according to the British Strategy, certain substances can be declared critical raw materials based on their supply and demand, their substitutability, their necessity and their level of security of supply. As risk factors increase, ensuring a supply of these raw materials can become critical. The risk level of the raw material can be increased by the rapid growth of demand, the high concentration of supply chains in certain countries, or large fluctuations in prices. Many of these critical minerals are produced in relatively small quantities or as companion metals, cannot be substituted in their application, and have low recycling potential. While the European Union has revised its list of critical raw materials three times since 2011, the U.K. has committed to an annual review in its 2022 strategy, which is carried

¹⁰ HUND 2020.

¹¹ HM Government 2022.

out at the Critical Minerals Intelligence Centre, run by the British Geological Survey. The British Strategy exceeded the current rules of the European Union, even though it is less difficult to create strategy and legislation at the national level, and it has become clear that the United Kingdom has recognised the new market challenges and is trying to gain a strategic advantage through planned market operations.

Critical raw materials in the global geopolitical space

The three focal points of the digitally polarised world and global competition that are the subjects of investigation of this study include the European Union, China and the United States. The latter's advantage on the world market is mainly due to its economic strength and innovativeness. As an example of technological development, it is worth highlighting the field of artificial intelligence, as the European digital transformation monitor showed in 2018 that 70% of the global economic impact of artificial intelligence will be concentrated in the United States and China.¹² This trend will determine the rate of development of all technologies in the geopolitical space. Due to the rate of technological development, a market-stimulating environment, and the current level of expertise, the fastest GDP growth was predicted to occur in the United States in the next few years, but by 2030, China is expected to catch up. Although the economy is booming, the regulatory environment lags far behind the level of maturity of its technological capability. The United States also wishes to regain its former strength in the field of rare earth minerals, and the U.S. Department of Defense is providing funding for the reopening and expansion of the old Mountain Pass mine in California, clearly with national security considerations in mind.

As noted earlier, the European Union wishes to become the leader in artificial intelligence regulation, but since 2017, China has also followed a progressive strategy.¹³ The Far Eastern country has set itself the goal of becoming a world leader in artificial intelligence by 2030. China is shaping transnational data management by providing digital infrastructure to emerging markets. The dominant explanation for this phenomenon is digital authoritarianism, whereby China exports not only its technology, but also its values and governance system to the host states. As a result of the Beijing effect, China's influence in data management is increasing far beyond its borders, as the governments of emerging countries adopt the digital infrastructures built in China and China's data management approach to digital development. In developing countries, the main drivers of the "digital silk road" are Chinese technology companies that provide telecommunications and e-commerce services around the world. The data sovereignty of these developing states is illusory, since they are unable to fully control the flow of information with the large-scale imports of Chinese infrastructure, while the limited development of

¹² European Commission 2018.

¹³ China Aerospace Study Institute 2017.

their internal legal system and political stability further intensifies this dependence.¹⁴ The Brussels effect manifests itself in the international operation of the market sector, when in their global activities, companies tend to standardise towards EU regulation. Individual EU legislation sets limits for technology companies on the European market and increases their expenses, to which they react in various ways. One possibility is that some companies withdraw from Europe due to the less favourable market environment, while another is that two prototypes (one conforming to European standards and one designed for non-European markets) are produced for the same product which doubles the cost of differentiation. In accordance with the Brussels effect, it may also happen that large technology companies integrate certain elements of EU regulation into their internal regulatory processes, thus European standards exert their influence around the world through the market sector.¹⁵

Not only companies, but also individual political forces can cooperate in fine-tuning the rules worldwide. A good example of this is the creation of the EU–US Trade and Technology Council, that serves as a forum for coordination between the two continents. The Council is also needed in order to moderate market fluctuations, by striving for the stability of the economy in technological development. The economic effects of digitalisation are well illustrated by the fact that the United States intends to shape global data management with the tools of international economic law.

The deposits of rare commodities are of strategic importance to China, where mining, processing and manufacturing technology are available.¹⁶ China uses several means to maintain its quasi-monopoly position on the market of rare earth materials, as shown by the recent scandal in which the Chinese Government was linked to an online disinformation campaign that was launched to discourage Western investors and which was not accidental. The fake news campaign, according to a report by the cybersecurity company Mandiant, was launched by the Dragonbridge company against the Western company engaged in the mining of Lynas and other rare earths in Australia.¹⁷

Just as the pandemic drew attention to the role of the digital space, the Russian–Ukrainian war underlined the issue of energy dependence. Since the outbreak of the pandemic, digital development has become a fixture on the European political agenda. Although the energy crisis and green transition were already talking points earlier, with the outbreak of the war the discourse became livelier. As a result of the war the digital raw materials necessary for transformation have been receiving more attention than formerly. As the British Geological Survey shows, since 2008, during the global economic crisis, China was ahead of its competitors, while digital and green technologies were becoming more widespread.¹⁸ In the last decade, the concept of critical raw materials appeared at the level of policies, since recently, during the fourth industrial revolution, the

¹⁴ ERIE–STREINZ 2021: 4.

¹⁵ BRADFORD 2020: 232.

¹⁶ IEA 2021.

¹⁷ COOK 2022.

¹⁸ Timeline of the development of the significance of critical raw materials in the global economy (BGS s. a.).

demand for raw materials for technological devices and for achieving carbon-neutrality has started to grow rapidly.¹⁹

Partly thanks to China's breakthrough in 2008, the country is Europe's main importer of critical raw materials. The European Union currently imports ten different critical raw materials exclusively from China, with Chinese imports accounting for 98% of European rare earth element imports.²⁰

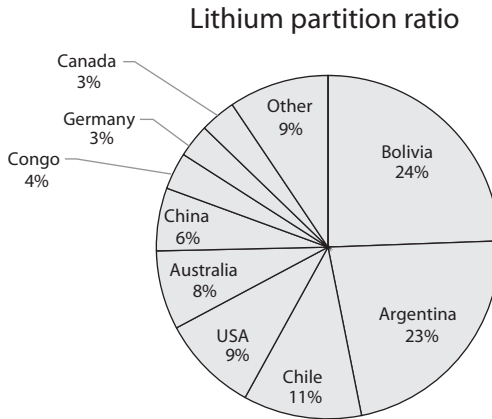


Figure 2: Distribution of lithium deposits on the world map based on data from the U.S. Geological Survey
Source: GONZALEZ 2021

Of the critical raw materials defined in the previous section, lithium, which serves as the material for batteries, has become as important in the twenty-first century as oil was in the twentieth. The rise in the price of this raw material also shows its increasing role, as in the last two years the price of lithium carbonate has tripled. Beyond the Atlantic Ocean, there are large reserves waiting to be introduced into the world economy, but their extraction is also a strategic, technological and political issue. Bolivia has the world's largest lithium deposit, lying under a salt field of several thousand square metres.²¹ Its extraction can only be realised with foreign technological expertise, so several large German companies have signed contracts with the Bolivian Government. However, the invasion of European companies for the purpose of extraction caused a heated debate among the indigenous people, so the Bolivian Government withdrew from the agreement and now intends to create sustainable jobs for the indigenous people in lithium mining.²² Strategic partnership agreements to secure the supply chain of critical raw materials must bear in mind the lessons of history, so guarantees against exploitation and "raw material colonialism" are necessary.

¹⁹ BGS s. a.

²⁰ IDOINE et al. 2022.

²¹ HANCOCK et al. 2017: 551–560.

²² JAMASMIE 2019.

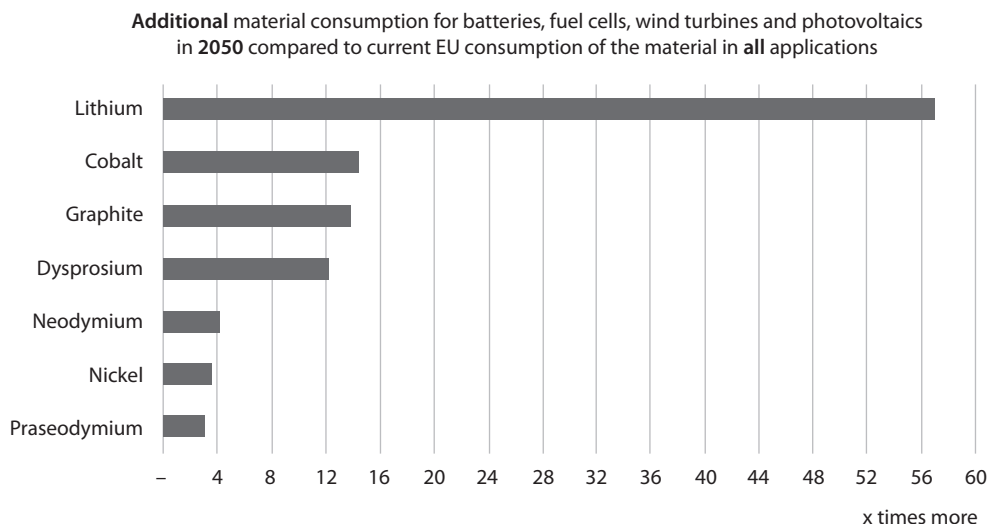


Figure 3: Expected increase in demand for critical raw materials until 2050

Source: European Commission 2020

Demand for the critical minerals that are essential for clean energy and other technologies is projected to expand significantly in the coming decades. Transparent, open, predictable, secure and sustainable supply chains for critical raw materials are vital to deploying these technologies at the speed and scale needed to effectively combat climate change. Digital development may result in a new dependency, as we are currently experiencing in the energy market. The intentions of the Beijing effect and the Brussels effect are different, while the former seeks to expand digital authoritarianism, the legislation of the European Union aims to differentiate markets and strengthen strategic partnerships.

A vision of how we can strengthen Europe's sovereignty and resilience

In a 2021 study, the International Energy Agency warned of an impending supply challenge in connection with the materials most needed to fight climate change. The global competition to secure raw materials will become even more pronounced if economies such as the EU accelerate the energy transition currently being considered in response to the war in Ukraine. Meanwhile, the problems of Europe's existing metal production must also be addressed. Refining is energy-intensive, and as a result of the high energy costs, silicon, zinc and aluminium production have come under pressure, with 10% of the aluminium industry temporarily closed, and 40% of the zinc industry shut down. According to the IEA study, there is theoretical potential for new domestic mines to cover 5–55% of Europe's needs by 2030, with lithium and rare earth projects already

underway.²³ It is also exciting to reflect on the question of how the critical raw material deposits within Europe in the Baltic States, the Czech Republic and Serbia will be valued in the future, and how this will redraw the geopolitical map of Europe.

On 28 June 2022, the European Union signed a cooperation agreement with Norway to coordinate strategic value chains and the extraction of raw materials. According to Geological Survey data, the northern bedrock covers the raw material needs of the green energy transition. Norway has the largest graphite mining area in Northwest Europe, while Sweden is also important in the extraction of rare earths. The Swedish presidency in the first half of 2023 can help to increase cooperation in the field of critical raw materials to an advanced level. In the program of the French–Czech–Swedish presidency trio adopted in December 2021, raw materials are also discussed, although it focuses more on the electricity and gas markets.²⁴

Without a strategic approach to the development of European primary and secondary raw material capacities, Europe cannot implement the green and digital transition, nor will its technological leadership and flexibility develop, so it is necessary to prepare the draft legislation on critical raw materials by the first quarter of 2023.²⁵ As previously noted, the pandemic accelerated the process of digital development, while the war highlighted the risks of security of supply of critical raw materials and the insufficiency of diversification. In the global competitive environment, the EU aims to ensure a stable supply, increase its strategic autonomy and reduce its dependence on imports.

The advantage of China, which plays a leading role in strategic sectors, seems invincible when individual states try to overcome it by individual acts through bilateral diplomacy. Only the establishment of longer-term strategic partnerships, which span several states, can make the global system of relations more balanced and reduce their dependence.

In the previously mentioned *Dragonbridge vs. Lynas* case, the United States Department of Defense awarded a contract to build an industrial facility to process heavy rare earth elements in Texas to reduce dependence in the area of strategic raw materials. The Dragonbridge company created hundreds of social media accounts through which it falsely drew attention to the health and environmental hazards of the proposed development. The example illustrates that China also uses the tools of disinformation in order to maintain its strategic advantage, even while it maintains an unfair market competition and neutralises its potential rivals. Following the American example, a similar influence campaign may also be conducted in Europe, as the European Union tries to extract part of its needs within its own region in order to reduce imports of Chinese raw materials.

One of the ways to reduce dependence on China is to build partnerships, so the EU formed the European Raw Materials Alliance (ERMA) in 2020 in order to increase investment and develop innovative technologies. ERMA's members include actors from the corporate, civil, governmental and scientific sectors. The formation of the ERMA

²³ IEA 2021.

²⁴ Council of the European Union 2021.

²⁵ BRETON 2022.

was announced on 3 September 2020 at the same time as the Action Plan for Building Resilience with Critical Raw Materials²⁶ and the publication of the 2020 Critical Raw Materials List.²⁷ The Action Plan examines current and future challenges and proposes actions to reduce Europe's dependence on raw materials from outside Europe, to diversify supply from primary and secondary sources, and to improve resource efficiency and circularity, while promoting responsible sourcing worldwide. The Action Plan on Critical Raw Materials aims to create flexible value chains for the EU's industrial ecosystems, to reduce dependence on primary critical raw materials through the circular use of resources, sustainable products and innovation, to strengthen the domestic procurement of raw materials in the EU, and affect international trade to diversify procurement from third countries by adjusting distortions. To achieve these goals, it ordered ten actions, and as a first step it set up ERMA. Furthermore, it has initiated cooperation with the scientific sphere and financed research on the possibilities of sustainable mining activities and the substitution of critical raw materials. One point of the action plan which deserves particular attention proposes the establishment of international strategic partnerships in order to ensure a diversified supply. A pilot partnership has been started with Canada which will then be extended to Africa and the EU neighbourhood from 2021.

Critical raw materials are vital to high-tech applications in the automotive, renewable energy, defence and aerospace industries. Ensuring a sustainable supply of CRMs is essential for Europe's transition to a green, digital and circular economy. Currently, coal-powered Chinese and Indonesian metals production plays a dominant role in refining metals and rare earth elements found in magnets used in wind turbines and electric batteries. Meanwhile, the EU relies on Russia for aluminium, nickel and copper supplies, which caused problems for the industry when the war broke out. It is thus essential to review Europe's domestic supply and demand, refining and recycling capabilities, and build partnerships with Ukraine, Serbia and Canada, among others, to reduce dependence on China and Russia.

On 22 September 2022, the Minerals Security Partnership (MSP) was concluded in New York, a multilateral initiative whose members (Australia, Canada, Finland, France, Japan, the Republic of Korea, Norway, Sweden, the United Kingdom, United States and the European Union) have pledged to work together to strengthen critical raw material supply chains for the transition to clean energy technologies. A further goal of the partnership is to produce, process and recycle critical minerals in a way that helps countries realise the full economic development potential of their resources. To achieve these goals, MSP attracts public and private investment, initiates the creation of joint projects, increases transparency and promotes high environmental, social and governance (ESG) standards in critical minerals supply chains.

In addition to their economic role, critical raw materials also have a national security significance that goes beyond military capabilities, since another state can use control over resources to assert its own political interests. Critical minerals, semiconductors and

²⁶ European Commission 2020b.

²⁷ BOBBA et al. 2020.

data are the oil, steel and electricity of the twenty-first century.²⁸ In the same way that the Covid-19 epidemic spurred digital development, the challenge of responding to the Russian–Ukrainian war has boosted the building of critical raw material partnerships to a similar extent. On the one hand, we have experienced what happens when the energy supply chains are interrupted. In 2022, we felt how vulnerable a state is if its range of importers of basic products is not diversified. On the other hand, the tensions that increase with energy uncertainty can accelerate the transition to renewable energy sources and escalate the demand for certain raw materials. Global events have caused disruptions in the supply chain and price fluctuations for critical raw materials, that can be eliminated in the short term, but whose longer-term effects should not be forgotten. When building strategic partnerships, more attention is now paid to the assessment of risks inherent in global supply chains, as well as to product awareness and increasing the importance of knowing the place of origin and traceability of products.

Summary

In the United States, after Joe Biden was elected president, he decreed that critical raw material supply chains have to be reviewed, and in the United Kingdom, the first critical raw materials strategy was adopted in 2022. It is clear that a broad effort to build global resilience has begun, as the major powers seek to ensure the smooth running of their supply chains, and hope to gain a competitive advantage, although the latter will only be understood in the perspective of the next decade.

This study has highlighted the uncertainty of the supply chains of critical raw materials that are essential for the green and digital transition, which is becoming a strategic sovereignty issue for Europe due to technological development. As the European Commission will present the draft legislation on critical raw materials in the first quarter of 2023, the tasks of the Spanish–Belgian–Hungarian Council presidency trio will be to examine the draft, to create strategies that ensure the raw material needs of forward-looking technologies, to conclude partnerships outside of Europe and to mitigate exposure from China while alleviating incoming technological and energy pressure from Russia. Since rapid development requires rapid action, it is conceivable that in the second half of 2024, during the Hungarian presidency, we may enter the final negotiation stage of the draft legislation on critical raw materials, so Hungarian strategic thinking will become of paramount importance in the area of maintaining the sovereignty of not only Hungary, but also the European Union.

A shortcoming of this study is that it did not fully present the critical raw materials flowing into Europe using an economic methodology. Although this was not the goal, since we focussed on exploring the possibilities of strengthening strategic sovereignty, a future analysis could provide a more detailed description of the thirty critical raw

²⁸ Spoken by Lord Sedwill, former National Security Adviser to the British Government, on 23 November 2021, in Geneva, at the UN Climate Change Conference (COP26).

material importer countries, and compare the import and export of critical raw materials between the European Union and the rest of the world. A more detailed investigation could also reveal the degree of dependence on raw materials in numbers. Nevertheless, the conclusion can be established with absolute certainty that efforts should be made to end the Chinese dependency relationship in terms of raw materials in order to strengthen European sovereignty.

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