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CHINA 2.0

STATUS AND FORESIGHT OF EU-CHINA TRADE, INVESTMENT AND TECHNOLOGICAL RACE

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

EU-China relations: between cooperation and competition

China's present role in the global order challenges the EU's ambition for open strategic autonomy, calling for a careful reassessment of the EU's trade, technological and industrial policies, and its overall global ambitions. Finding the right balance between cooperation and competition with China requires the EU to acknowledge the balance that must be struck between its commitment to openness and free trade on the one hand, and coping with restrictive policies imposed by China on the other.

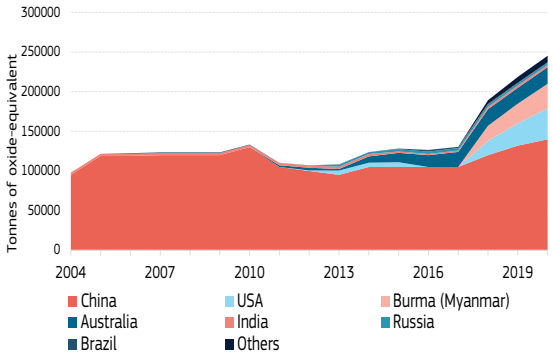
The overall policy framework to manage the complexity of opportunities and challenges posed by China is set out in the 2019 Strategic Outlook of the EU-China relations. China is considered "simultaneously, in different policy areas, a cooperation partner with whom the EU has closely aligned objectives, a negotiating partner with whom the EU needs to find a balance of interests, an economic competitor in the pursuit of technological leadership, and a systemic rival promoting alternative models of governance."

The EU may need to cope with a greater dependence on China in the short term, due to higher demand for materials and products for critical industries, including those for the green and digital transition. A large share of EU imports (e.g. consumer electronics and apparel) strongly depend on China. Among them, final goods such as cameras, multifunction printers, flash memory cards and most garments show high import dependence (80% or more of the total supply), a high share of imports from China (40% or above), and China's high global market share for these products (with a share in the 40-50% range). The strong dependence on products to tackle COVID-19 at the outbreak of the pandemic (such as LED lamps and facemasks), for which China had a dominant position on the world market, was illustrative of the risks and vulnerabilities to be addressed.

Dependencies concern raw materials and critical resources for EU value chains. 30% of raw materials production and 40%-50% of processed materials worldwide are concentrated in China.

Strategic sectors deserve particular attention, as in many of them China is also a major supplier of raw materials and of products along the whole supply chain. At the global level, China supplies an average of 30% to 40% of raw materials, processed materials, components, and final assemblies in nine technologies. These are batteries, fuel cells, wind power, electric traction motors, solar photovoltaics (PV), robotics, drones, 3D printing and ICT. The EU only supplies about 20% of processed materials and assemblies, 10% of components, and 3% of raw materials. China's share of manufacturing reaches even higher, quasi-monopolistic levels in fields such as batteries (66%), solar PV modules (70%), solar PV cells and wafers (89%), and rare earth permanent magnets (90%).

Figure 1: Production of rare earth elements over 2004-2019

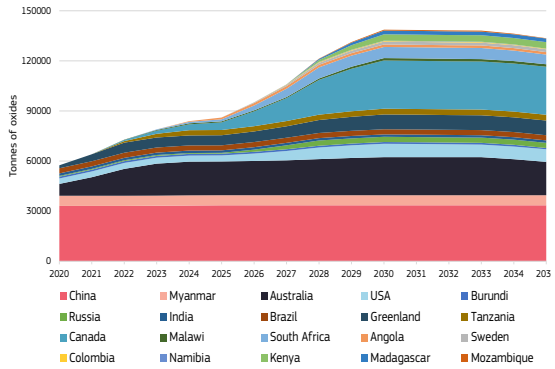


Note: Chinese official production only.
Source: USGS (2005-2020)

This also highlights China's consolidation in higher-value segments downstream in the supply chain, which is particularly clear in the case of rare earths, where China has used its

dominance in mining and refining to stimulate the manufacturing of alloys and magnets.

Figure 2: Future distribution of rare earth supply



Note: oxides used in permanent magnets only.
Source: JRC (Alves Dias et al., 2020)

Recent developments in EU-China trade, investment, and technological competition

Chinese Mergers and Acquisitions (M&A) grew by 21% between 2017 and 2020 compared to 2013-2016. This is the highest rate for inbound deals from any strategic partner. Manufacturing, and high-tech companies in particular, attracted the largest share of Chinese M&A deals in the EU (more than 47%) between 2013 and 2020, in different segments of the value chain.

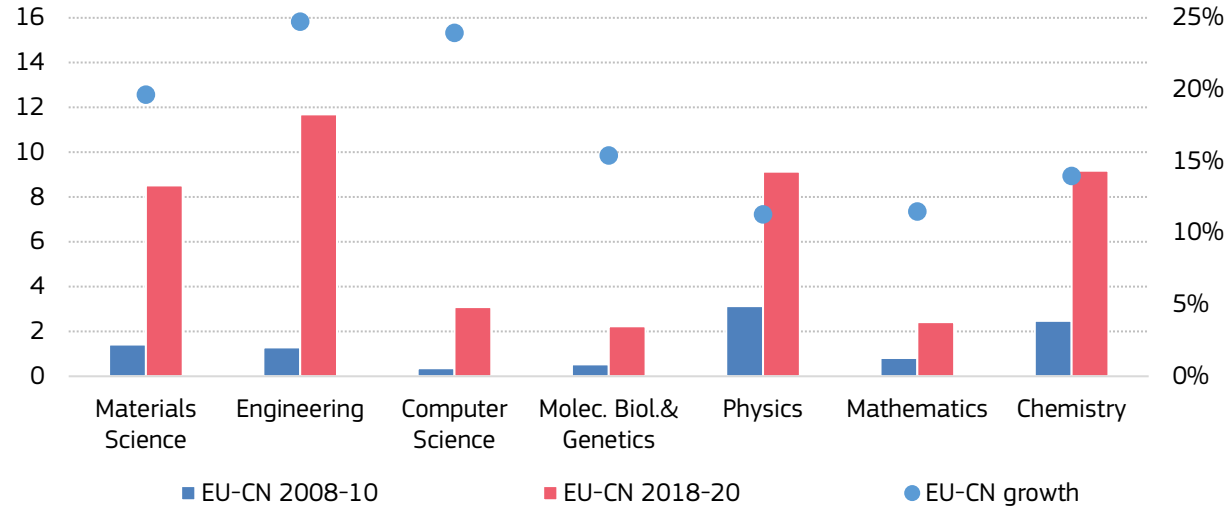
Chinese M&As in the EU fell during the COVID-19 pandemic, due to the reorganisation of global value chains (GVCs), together with the new development strategies pursued by the Chinese government called Made in China 2025 (MIC2025). Between January and December 2020, total Chinese foreign direct investment (FDI) deals in the EU were 36% lower than in the same period of 2019. The negative shock due to the pandemic was stronger for greenfield investments than for M&As. Chinese FDI activity in the EU continued to fall in the first quarter of 2021, and investments by China's state-owned enterprises (SOEs) consistently followed this trend. As of 2019, the reduction in the number of M&A deals in high-tech and low-tech sectors coincides with a slowdown in trade flows between the EU and China. Support to boost domestic demand and improve China's supply chain through FDI or technological upgrading denote China's **dual circulation strategy**. This entails improving China's domestic conditions and increasing exports by diversifying the sources of imports away from developed economies, particularly the US, and redirecting exports towards emerging economies as per the *Belt and Road Initiative* (BRI), to promote open emerging markets.

The EU-China trade deficit is driven by higher import dependence on China and market restrictiveness *vis-à-vis* the EU. EU companies' access to the Chinese market is hampered by a lack of transparent regulation and intellectual property (IP) protection, and preferential treatment for domestic producers. For example, access to the Chinese market remains challenging in the wind energy sector, relying on partnerships and licensing agreements with Chinese counterparts. Although Chinese IP protection improved in the last decade, a number of infringements explain why in 2020 EU companies refrain from bringing innovative technologies to China.

Electronic and ICT companies in the EU are attractive for Chinese investors in a period of economic turmoil, especially for semiconductors. FDIs by Chinese SOEs and private entities in EU companies operating in the electronics and ICT sectors reached a peak in 2017, due to acquisitions made by Chinese SOEs. Interestingly, the total value of deals in 2020 was three times larger than in 2019, thus confirming the interest from Chinese investors. The complexity of the ownership structures in private Chinese companies and the heavy reliance on state financing often dilutes the distinction between private and state-owned companies.

A significant upgrading of the ICT manufacturing sector is taking place in China, with a clear shift away from low-tech sectors. Semiconductors, optics and audio-visual technology are the fields that have seen the largest increase both in terms of total number of patents and specialisation. This is in line with China's growth in terms of the top research and development (R&D) investing companies (China: + 61 while EU: -20 in 2019-

Figure 3: International co-publications relevant for the Chinese Revealed Scientific Advantage (RSA)



Note: n = thousands of research papers, Compound Annual Growth Rate (dots).
Source: JRC elaboration based on INCITES (Web of Science) data

2020) and respective R&D share (CN: +9.6% in 2014-2020). This growth is mainly at the expense of the EU and Japan, whose share has declined in recent years (EU: -3.6%, JP: -2.1% in 2014-2020).

In response, the EU should boost its research and innovation (R&I) performance, also in light of the continued increase in China's high-impact publications. China has overtaken the EU in terms of its share of the top 1% most cited publications in the world. By 2020 it had almost caught up with the US, whose share of the top 1% most cited publications (about 1.6% in 2019) has been decreasing for the last five years. China's specialisation is most impressive in the fields of molecular biology and genetics, with a very significant growth in publications, and a level of specialisation almost equal to the US, the most specialised in these fields overall. In the fields relevant to its scientific specialisation, China co-publishes more with the US than it does with the EU. Growth is also consistently higher in US-CN co-publications than for EU-CN ones, particularly in the field of materials science. While the Chinese market traditionally attracts foreign businesses because of its size and growth potential, its inherent challenges led to widespread negative sentiments among EU businesses and investors at the onset of the pandemic. EU exports to China are dominated by western European countries with Germany ranking first, and much higher than the rest. Moreover, **protection of IP will remain key** in securing the EU's technological leadership in the future.

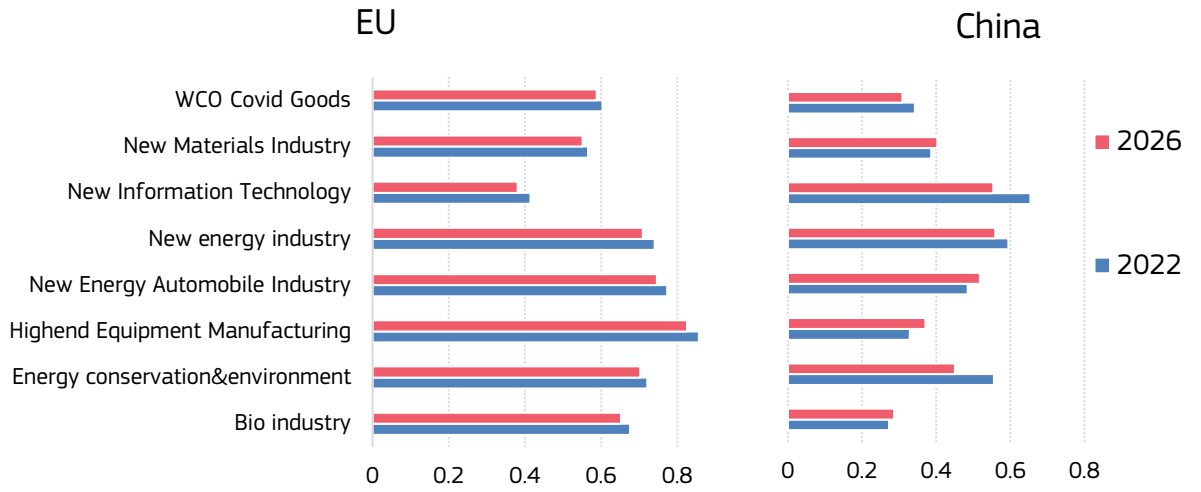
Long-term trends affecting the EU's and China's competitiveness in strategic sectors

By 2050, rising demand in the EU for critical raw materials in a number of strategic sectors relevant to the twin green and digital transition (batteries, fuel cells, wind power, electric traction motors, solar PV, robotics, drones, 3D printing, and ICT) may be up to 58 times greater than the current consumption in all applications for lithium, 15 times greater for cobalt, 14 times greater for graphite, and 12 times greater for dysprosium.

Since 2015, the largest share of the global wind energy capacity is deployed in China, while in 2019 EU companies accounted for only 2.5% of the new capacity installed. China is also expected to prevail in the mid- to long term in wind energy generation, with 800GW of cumulative wind capacity in 2030 and 3000GW in 2060.

China's competitiveness has steadily grown in industries of future strategic relevance for the EU, while the EU is competitive in areas linked to the green transition. In recent years China improved the

Figure 4: Product progression probabilities in selected fields



Note: Product progression probability represents the probability that a country will become (or remain) a globally competitive exporter of a given product within a five years horizon.
Source: JRC computations based on COMTRADE data

complexity of its production structure in most high-tech sectors such as ICT, materials and energy. The EU is competitive in sectors related to the twin transition but forecasted to lose relative trade competitiveness in the long run, while China has positive prospects in four sectors: new materials, new energy automotive, high-end equipment and bio-industry.

Looking into the most relevant products under each of the priority sectors in which China is likely to remain a competitive exporter, neither the EU nor China (and similarly the US) are able to be generally competitive in all of them. For products related to 'Industry 4.0', the EU is likely to remain in the lead in industrial robots, but with a low level of competitiveness expected for some components, such as processors (where the US is in the lead) and memories. China would still prevail in wind energy generation but for products related to the wind energy industry the EU should remain competitive overall. China (and even the US) would fall behind in high voltage distribution panels and meteorological surveying equipment.

On the other hand, the EU has generally worse prospects than China or the US in new functional materials. Interestingly, the US would lead in polarising materials but not in technologically related optical fibres, which points in favour of **possible complementarities between different economies**. In new energy automotive products, the EU would still lack competitiveness in lithium-ion cells vis-á-vis China, while the US does not show good prospects in low-power AC electric motors, used in hybrid vehicles. Finally, the EU could perform better than China and US in rail transportation equipment, while the US has good prospects in traffic control equipment and locomotives, but not in railway maintenance vehicles.

These examples show the heterogeneity of product-level competitiveness in strategic sectors of high technological complexity and the interdependence between the most advanced economies. **This points to the important role that GVCs will continue to play and the need for the EU to preserve the open dimension of its strategic autonomy agenda and enjoy its benefits based on the complementarity of its partners.**

Policy implications

This report emphasises long-present and persistent trends and could not obviously address political developments of the recent months prior to its publication. Furthermore, EU-China relationships are also influenced by direct US-China developments, due to long-standing ties, commitments, and security arrangements.

Nevertheless, on the basis of the analysis carried out, a regular **evidence-based assessment of the future prospects in EU-China relations** appears crucial. Striking the right balance with China between competition and

collaboration appears particularly challenging and important. Wide-ranging aspects related to fairness in trade conditions, access to markets and reciprocity in EU-China relations need to be taken into account. The analyses and results contained in this report point to the following policy implications:

- ***The EU may need to reduce its dependence on China in materials and products for critical industries*** *to reach its objective of competitive sustainability, for which open strategic autonomy in technology is needed. Some dependencies can be addressed through diversification or domestic production, while others might be conducive to vulnerabilities such as those arising from lack of alternative suppliers or high transaction costs. Resilience is therefore needed to mitigate supply chain disruptions* and *respond to sudden challenges such as those that emerged from the COVID-19 pandemic or the war in Ukraine, and to limit the impact of those that may occur in the future.*
- ***Current trade relations need to be re-examined to enable, in the long term, technology diffusion through trade.*** *Trade relations are unbalanced and indicate persisting Chinese market barriers created by a set of policies that protect China's domestic market (e.g. local content requirements, import tariffs and local VAT exemption).*
- *The nascent but* ***rising offshore wind market presents the opportunity for the entry of EU companies,*** *given their experience in crucial segments of the supply chain. In particular, cooperation in the offshore installer market might be crucial for the Chinese offshore wind market, as the availability of installation vessels does not match current deployment plans.*
- ***The EU's long-term targets for the twin transition and the pursuit of open strategic autonomy highlight the need for a secure supply of critical materials and products, particularly in cases where China's dominance in the market (e.g. rare earths, li-ion batteries) makes the value chains extremely vulnerable.*** *The current global chip shortage highlights the major impact that similar disruptions may have on industry. To tackle the EU's exposure to Chinese and other global suppliers, well-targeted interventions could lead to: (i) diversifying the materials supply; (ii) improving manufacturing opportunities in the EU; (iii) recycling, reusing and substituting materials and products; (iv) promoting corporate R&D and more effective implementation of science, technology and innovation policies and support instruments; (v) developing relevant skills and competences; (vi) enhanced collaboration with like-minded partners; and (vi) fostering international collaboration and standardisation activities.*
- ***The EU and China have an opportunity to align commonly applied criteria in key industrial sectors,*** *involving efforts to make cross-border supply chains more sustainable and to extend producer responsibility. Collaboration among EU, China and US on the global setting of standards may help preventing a tech divide and enforcing democratic accountability and transparency. Adopting standards for the design and development of new products, as well as tracking and monitoring of material flows, may help to create a policy dialogue to collaborate on roadmaps and targets to measure socio-economic and environmental impacts.*

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