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Risk of Technology Transfer to China

In Austria's Security and Defence Industry

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AIES FOCUS

Risk of Technology transfer to China in Austria's security and defence industry

Abstract

China is seeking to enhance its technology base and simultaneously its military potential by acquiring foreign technology. Therefore, technology transfer through direct investment is a method of choice, either by acquisition of innovative companies in the EU or by forced technology disclosure of EU companies investing directly in China. Due to inadequate or non-existing regulations and supported by national public funding, the transfer of key technology to China poses an increasing threat to Austria's and the EU's security and defence position. As a consequence, a thorough risk assessment regarding technology transfer from Austria to China is recommended.

Introduction

As European Commission President Ursula von der Leyen stated in her speech of March 30, 2023, "We can expect to see a greater focus on security – whether military, tech or economic. All companies in China, for example, are already obliged by law to assist state intelligence-gathering operations and to keep it secret. [...] [However,] it is neither viable – nor in Europe's interest – to decouple from China. Our relations are not black or white – and our response cannot be either. This is why we need to focus on de-risk – not de-couple. [...] [Especially as] we know there are some areas where trade and investment poses risks to our economic and national security, particularly in the context of

China's explicit fusion of its military and commercial sectors. This is true for certain sensitive technologies, dual-use goods or even investment which comes with forced technology or knowledge transfers".¹

Following this pointed speech, the EU released a strategy paper in June 2023 regarding a de-risking strategy. Therein, the importance of a risk assessment in the areas of resilience of supply chains, infrastructure security, economic dependency or coercion, technology security, and technology leakage is emphasised. It also suggests mitigating actions, including fostering the EU's technological base, cooperating with partners, and considering new policies and tools to limit negative unintended spillover effects.² In contrast to President von der Leyen's speech, the EU strategy does not explicitly focus on China. However, the intention of that strategy paper to address the rising concerns in EU-China relations, especially regarding technology transfer, is clear.

For the moment, China depends on international technology exchange both to outpace the US in military and geopolitical terms, and to increase its own economic prosperity. As a consequence, it is still in China's interest to actively participate in technology transfers and to counteract the widespread tendency to contain (e.g. through the US semiconductor export control policy implemented in 2022) China's access to international technology developments

and markets. Nevertheless, China frequently takes individual retaliation measures against unwelcomed behaviour of foreign nations, companies, and people. Furthermore, it exploits all options to evade access restrictions to US technology and comprehensively subsidises its innovation base.³ For instance, China subsidises Chinese companies in their foreign investments which causes distortions of competition in the applicable markets.⁴ China has also been restricting access for foreign companies to its science, technology and innovation sector while engaging in international technological cooperations. China pursues the enhancement of its international competitiveness by acquiring external technologies, either by legal or illegal methods. In the long run, China's reliance on foreign developments is bound to be replaced by domestic technology.⁵

As stated in the Outline of the 11th Five-Year-Plan for National Economic and Social Development in 2006, dependence on foreign core technology should be reduced "by enhancing independent innovation ability". To achieve that goal, among other measures, both inbound foreign direct investment (FDI) for the import "of foreign advanced technology" and outbound FDI to "develop economic and technological cooperation" were promoted.⁶ This issue was further addressed in the 2016 Outline of the National Innovation-Driven Development Strategy

with special emphasis on the enhancement of dual-use technologies by establishing “a military-civil fusion platform for collaborative innovation in national defence science and technology”. This military-civil fusion includes the improvement of coordinated, integrated multidisciplinary development from basic research to integrated applications in key technology areas. Thereby, the development strategy demands sharing of resources, strategic planning, interchangeability of basic materials and parts, application of advanced civilian technology in military fields, and formulation and consolidation of general military-civilian standards. Furthermore, it orders to “perfect the import administration mechanisms for military-civil dual-use materials and technology”⁷ which aims directly at using foreign technology to increase Chinese military capabilities.

Hence, China’s development strategy supports the exchange of technology, funds, and other resources between its military and commercial spheres.⁸ Therefore, China uses its substantial economic power to influence foreign behaviour which poses a significant security threat to other nations and companies.⁹ But since de-coupling from China would have a major negative impact on Europe’s economic value added¹⁰, a de-risking strategy is a more suitable option. And to avoid facilitating a greater Chinese security threat by supporting its military development, a risk assessment of technology transfers to China is recommended. As a starting

point, direct investments from and to China in the Austrian security and defence sector should be thoroughly scrutinized.

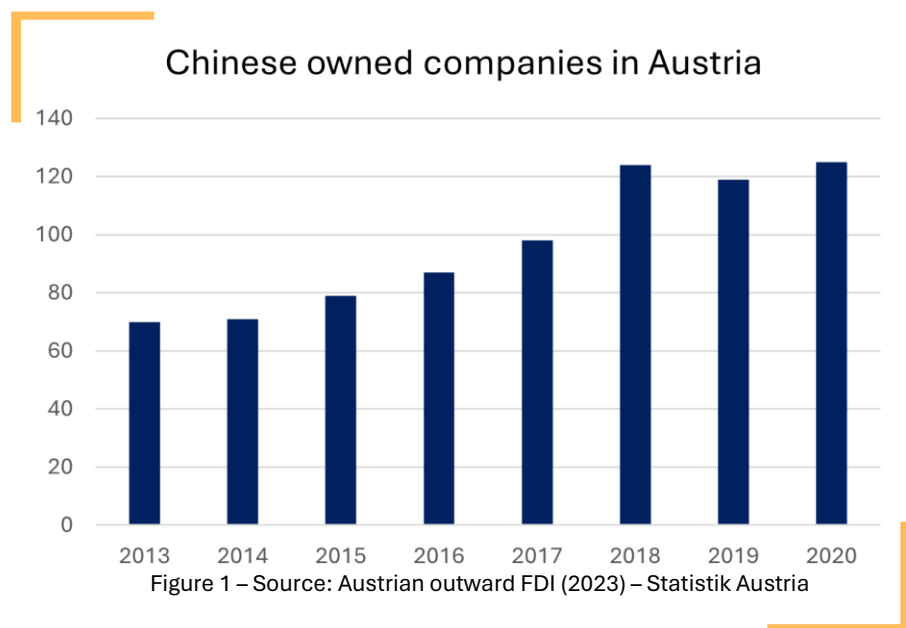
Technology transfer through Chinese investment in Austria

Chinese companies are invited by their government to actively seek international cooperations in key technology sectors according to the “Made in China 2025” (MiC2025) strategy.¹¹ Beijing’s comprehensive financial investments target technology sectors such as semiconductor production, artificial intelligence (AI), facial recognition, quantum computing, and cloud computing. The output of these investments is supposed to be of civil and military value.¹² Both the encouragement to cooperate and the available financial capital motivate Chinese companies to invest in foreign technology companies. Thereby, a direct technology transfer can be achieved through the acquisition of the whole foreign company. The pursued strategy also en-

compasses niche sectors targeting market leaders in key technology fields even with low investment volumes.¹³

In 2020, 125 of overall 12,500 foreign-controlled Austrian companies of various sectors were directly under Chinese (including Hong Kong) control (with a share of more than 50% of their equity). These employed over 11,600 people and achieved revenues of more than € 3.4 billion in Austria (of overall 635,000 people employed by foreign-controlled companies in Austria, with revenues of about € 260.6 billion). Although the number of Chinese-controlled companies in Austria in 2020 was significantly lower compared to e.g. Germany (4,871), Switzerland (1,393), Italy (785), the Netherlands (570), the UK (541), the US (523), Hungary (390), France (354), and Liechtenstein (300), it had increased by 79% since 2013 (70).¹⁴

Moreover, the Austrian security and defence sector¹⁵ does present examples for the acquisi-



tion of shares in Austrian companies by Chinese actors: the Austrian aircraft developer and manufacturer Diamond Aircraft Industries GmbH was acquired in 2017 by the British Wanfeng Aviation Co. Ltd.¹⁶, which is a subsidiary of the Chinese Wanfeng Auto Holding Group¹⁷. Likewise, the SVI Austria GmbH, specialized in the development and production of electronic and mechatronic components, belongs to SVI Public Ltd., registered in Hong Kong.¹⁸

In 2020, EU framework legislation on the screening of inward FDI was adopted. This framework, which is considered an additional measure to existing national regulations stipulates the exchange of information on FDI posing a security risk to the EU. The nations concerned determine whether certain investments should be blocked.¹⁹ The approval of inward FDI in Austria is regulated by the “Investitionskontrollgesetz” (investment control law), which was adopted in 2022.

Its main objective is the prevention of threats to security or public order. In relevant circumstances, this act prohibits an uncontrolled, direct or indirect, partial or complete takeover of or a substantial influence on Austrian companies by foreign entities and individuals. It focuses on highly sensitive sectors such as defence technology, data sovereignty, semiconductors, telecommunication or medical products. However, not all Austrian companies are encompassed. The acquisition of

very small and start-up companies which are vital for technological development is explicitly exempted.²⁰ This loophole enables foreign actors to acquire technology that bears the potential to enhance Austria’s future security and its technological competitive advantage towards China.

Particularly start-ups are very important innovation drivers that enhance an economy’s technological potential. Between 2011 and 2021, more than 3,300 start-ups had been founded in Austria. These young companies declared not only to use the founders’ own funds but 68% also received national and international public funding. The most important funding institutions were the Austrian Research Promotion Agency (FFG), the Austrian promotional bank (AWS), and funding programmes of the European Commission (EC).

Furthermore, next to other funding sources such as bank loans or companies’ cash-flows, 16% of these start-ups were provided funding by venture capital in 2022.²¹ Venture capital investments are considered private equity and, as they invest their client’s money, its funds cannot easily be traced back to their origins, which are often large national or international institutions. Their main interest is to invest in start-up companies with high potential and to influence their development. Venture capital investors gain direct access to technological innovations through such start-up acquisitions.²² China is also known for using venture capital companies

to invest in start-ups, either for acquiring technology or recruiting experts involved in the innovation process in priority sectors. One example of a globally operating Chinese venture capital company is the Suzhou Oriza Holdings Corporation with investments in international assets.²³ That strategy is supported by institutions targeting key technology even before a start-up was founded. In Austria, the Chinese state-owned China Electronics Technology Group Corporation established a subsidiary in Graz in 2016. Its main focus is on defence and security electronics as well as cyber security.²⁴ Consequently, investments in small and start-up companies should be covered by relevant regulations as well, starting with university-related companies²⁵, e.g. spin-offs, and investments done by venture capital.

Technology transfer as a consequence of Austrian investment in China

An alternative form of technology transfer may come about due to outward FDI, i.e. investments in China by foreign companies or persons. Thereof, the establishment of joint ventures in China together with Chinese partners is a specific form of investment. This kind of cooperation has been a prevailing method for international companies to gain access to the Chinese market. Chinese counterparts in joint ventures are entitled to the disclosure of foreign technology provided by their international partner. Until now,

foreign companies have concentrated on Chinese partners who, on the one hand, are highly productive and profitable and, on the other hand, have access to public networks and, therefore, receive considerable subsidies. The overall value of the involvement of an international partner for the Chinese joint venture is an increase in sales, productivity, and innovation. This is a result primarily of the technology transfer from the international partner to the joint venture. The technology transfer not only positively affects the Chinese cooperation partner but the whole industry sector. Usually this spillover effect is highly perceptible in sectors with distinct research and development activities.²⁶ An important example for an Austrian-Chinese joint venture presents the cooperation of the Chinese SAIC Motor Corporation and the Austrian TTTech Computertechnik AG. The joint venture's main purpose is the development of intelligent mobility technology. Besides providing solutions for automated mobility, TTTech is engaged in technol-

ogy areas such as the communication between machines or safety-critical applications in planes, cars, or in space²⁷ and, therefore, a provider of military-relevant solutions.

In consideration of the required disclosure of intellectual property, until recently international companies were able to provide a joint venture in China with outdated technology. With rising economic pressure by Chinese policy, this tactic is not easily applicable anymore. Especially with the introduction of the MiC2025 strategy in 2015, public subsidies and further business opportunities were tied to international companies' willingness of technological cooperation. Hence, dissemination of the latest technological developments is likely to accelerate.²⁸ In addition, since European companies increasingly conduct research and development directly in China, it is possible that highly relevant technology in certain technology fields is already being transferred within China.²⁹

However, not all international entities need to be involved in a Chinese joint venture to become active on the Chinese market. Options range from establishing simple representative offices to investments in a subsidiary as a "wholly foreign-owned enterprise" (WFOE).³⁰ In 2020, Austrian companies owned a total of 266 subsidiaries (companies controlled with more than 50% of their shares) in China, thereof 37 in Hong Kong, employing in total 41,000 people and generating a revenue of more than € 12 billion. This presents a noticeable increase compared to 2013 when 29,000 people were employed with 198 subsidiaries (thereof 25 in Hong Kong) generating a revenue of nearly € 19 billion. The decrease in revenue compared to 2013 was due to the pandemic related worldwide economic downturn in 2020.³¹

In this regard, examples of the Austrian security and defence sector are noteworthy.³² For instance, the microelectronics company AT&S Austria Technologies&Systemtechnik AG is a 100% shareholder of a Hong Kong-based subsidiary.³³ It owns a manufacturing site for high-density interconnection printed circuit boards in Shanghai, and another one in Chongqing, developing and producing substrates for high-performance processors, 5G, and AI.³⁴ Another example is Frequentis AG, a provider of mission-critical communication, information, and surveillance systems³⁵, with a Chinese subsidiary also located in Shanghai³⁶. Even the weapons manufacturer Glock GmbH, with its subsidiary Glock

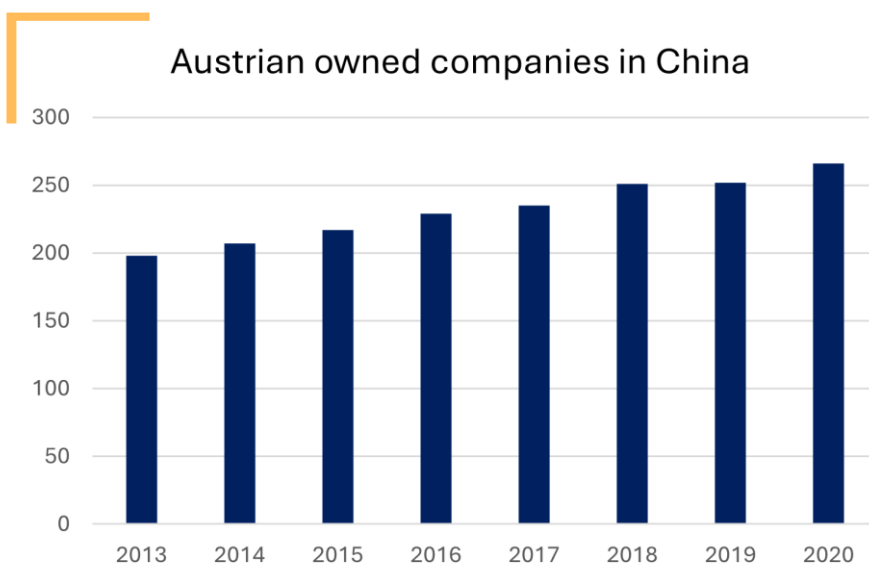


Figure 2 – Source: Austrian outward FDI (2023) – Statistik Austria

Asia Pacific in Hong Kong, is an example of Austrian direct investment in China.³⁷

The EU has recognized the urgency of a comprehensive screening of its member states' outward investments. Since financial transfers often correlate with technology transfers, such an instrument would be a proper step to contain the technological development of China's military sector.³⁸ A screening mechanism for outward FDI should solely focus on key technology areas and products based on qualitative and quantitative criteria and should also review deals involving relatively small sums of investment.³⁹ This instrument can be an integral part of a wider range of defensive measures to prevent forced technology transfer and the purchase of dual-use products with key technology which is necessary for securing the EU's technological position in the security and defence sector.⁴⁰

Following the EU's 2022 Strategic Compass, it is vital to ensure the EU's technological sovereignty with reduced dependencies and a resilient value chain. "An innovative, competitive and resilient European Defence Technological and Industrial Base which guarantees security of supply and cutting-edge technologies is more important than ever and key for [...] security." Furthermore, through investment in key technology a military advantage shall be maintained especially if systemic rivals such as China do not follow international norms. Therefore, both encouraging investment in the EU's

own defence capabilities and innovative technologies and the screening of FDI for reducing security risks is of essence.⁴¹

Public funding for technology transfer

Before launching advanced ready-for-use products, the development of security and defence technology requires, already at an early stage, substantial financial means. Several international and national public funding agencies provide financial support for fundamental research, applied research or experimental development. In Austria, the EC, FFG and AWS are of particular relevance. In 2021, FFG alone provided € 674 million for the funding of research and development projects⁴², while AWS provided another € 247 million. Indeed, public funding is insufficient to cover all research and development projects. Therefore, certain centres of gravity are defined in funding calls and selection criteria are stringent. Quite a few funding programmes focus on the development of security and defence technology. While the FFG Austrian Security Research Programme aims at national research and development institutions⁴³, the European Defence Fund attracts defence companies and research actors of all European countries⁴⁴.

Recently, some funding programmes were established that allowed or even deliberately encouraged the cooperation of Chinese and Austrian companies for research and development of advanced technology. A

prominent example is the Global Incubator Network Austria-GO HONG KONG 2023 which attracts Austrian start-ups in areas such as health technology or AI. It supports the entry into China's market and even connects Austrian start-ups with Chinese venture capital investors.⁴⁵ This also applies to the FFG Austria-Guangdong Research Cooperation Programme that supports projects in cooperation with the Guangdong Department for Science & Technology in the main research and development areas smart city, green buildings, and ICT.⁴⁶

Although these programmes do not explicitly address cooperation in the security and defence sector, their focus contains research and development on dual-use technology utilizable for security and military purposes. For instance, in China smart city research was used through a combination of geographical information to provide the military with battlefield and defence operation visualisation. Furthermore, Chinese smart city research is recently focusing on the intelligence of interconnected devices and, therefore, on installing sensors in cities that can be centrally controlled and analysed by AI-assisted cloud computing.⁴⁷ Hence, results of research and development projects supported by this program are probably used for military and security purposes too.

As a consequence, future funding programmes permitting or aiming at a cooperation with Chinese actors will require thorough

scrutiny in accordance with the EU strategy. Funding guidelines, therefore, should consider risks connected with their promotion of certain technology transfer and deny funding to projects in key technology fields.

While the objective of certain programmes is questionable, some strategically relevant technology areas do not receive proper attention. Particularly the development of AI is in dire need of substantial public funding, not least due to its increasing relevance and international research dynamics.⁴⁸

As long as the Austrian government is reluctant to substantially expand financing highly risky but important innovative areas of technology and continues to transfer the financial responsibility mainly onto the private sector, the risk of failing to keep up with international technological development opportunities remains significant. Moreover, this mindset enhances the probability of financial contributions by Chinese actors to step in for insufficient funding of this key technology field. This poses an additional risk as these actors can utilize technology transfers to boost the Chinese military and its technological base rather than to empower Austria's own security and defence capacity. In Austria several companies of the defence and security sector already apply AI in their products or services which might draw further attention from abroad.⁴⁹ For instance, Desoma GmbH uses AI in support of the detection of cyber threats⁵⁰ and cogvis

Software and Consulting GmbH uses AI for its 3D security system⁵¹.

A key technology that has already raised public interest is semiconductors. With the "Important Projects of Common European Interest" (IPCEI) policy the EU aims to enhance the Union's research and innovation capabilities for a thorough digital transition. Therefore, 32 European companies and research institutions receive a € 1.9 billion of funding for the development of applicable innovation in technology fields such as chips, power semiconductor devices, intelligent sensors, and advanced optical devices. Austria obtains a € 146 million of these funds and participates in the project with well-established companies such as AT&S.⁵² AT&S, has, as presented previously, subsidiaries for development and manufacturing in China. Hence, a spill-over effect through the transfer of key technology developed with IPCEI funding is probable and presents a risk for unwanted technology transfers to China.

How to react to risks in technology transfer

The EU strategy's main goal for enhanced economic security is to minimise "risks arising from certain economic flows in the

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context of increased geopolitical tensions and accelerated technological shifts" – thus, de-risking. That requires Austria, together with other EU members, to determine a framework for properly identifying, assessing, and managing risks. In accordance to do so, the EU strategy recommends starting with certain tasks, such as compiling a list of relevant key technological areas, intensifying the dialog with the private sector about economic security, supporting research and development of dual-use technologies, setting up an inward FDI screening regulation, and assessing risks related to outbound FDI.⁵³ Therefore, as a first step, it is important to specify and harmonise the categorization of relevant technology areas among the member states, taking into account requirements of dual-use and military material classifications. More so, as China uses inadequacy in regularity frameworks to circumvent existing weapons embargoes and restrictions in the trade with military products.⁵⁴

When preparing suitable measures for the reduction of risks in economic relations, possible implications to international partners must be considered. For instance, the negligence of repercussions of the US semiconductor export controls and Inflation Reductions Act (IRA) to the EU demonstrate the necessity to coordinate more closely between like-minded partners such as the USA and the EU.⁵⁵ In the IRA especially the "local content requirement" was regarded

by the EU as a protectionist measure with an impact on certain trading sectors. Furthermore, the IRA attracts FDI and might even encourage European companies to relocate to the US, supported by public subsidies.⁵⁶ As a consequence, Austria and the EU should coordinate more closely with partners when preparing measures to reduce the identified risks.

To improve Europe's and Austria's resilience, an enlargement of its defence industry and market capabilities to cope with future production requirements, combined with increased private and public investment in security and defence research, is also advisable. Innovation fostering actions include national and international interdisciplinary research cooperation and a closer public-private partnership especially between civil and military actors.⁵⁷ Those actors might include public and private research institutions, defence and security developers and manufacturers, state owned enterprises, or public authorities.

Public-private partnerships are already supported by the EC within its Horizon Europe funding program, aimed at avoiding "the duplication of investments and [to] contribute to reducing the fragmentation of the research and innovation landscape in the EU".⁵⁸ That program could be extended to encompass research on security and defence technology, aligned with the European Defence Fund. Thereby, using similar instruments as China does, the EU

should support its strategic goals while levelling competitive disadvantages due to Chinese subsidies.

Even though de-risking is the more compelling method for preventing unwanted technology transfer, in some scenarios de-coupling (i.e. the use of public policy tools to separate the multifaceted economic ties), as the more suitable approach, should be considered. Particularly, China shall be prevented from access to defence and security technology which not only supports their aspiration for technological leadership but also discloses highly sensible information about military applications in the EU. Possible instruments for that purpose are investment restrictions, export control, the deliberate disruption of supply chains, and the intermittence of data processing (e.g. prohibiting data transfer through the internet).⁵⁹

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De-coupling in particular areas would send a distinct message without necessarily harming all cooperation (since it focuses on selected technology only). Moreover, when it comes to restricting access to important military applications, the EU needs to accept certain consequences. In any case, before implementing such instruments, the possible impact of likely Chinese repercussions needs to be assessed

and countering preparations such as diversification of supply chains or attracting investments from other countries be established.

Nevertheless, de-coupling should be used in accordance with international regulations, such as the World Trade Organization (WTO) agreements, in anticipation of possible repercussions. Alternatives appear in the same instruments China is so keen to use: restrictions in public procurement and deliberate public funding.⁶⁰ Since the EU and Austria have existing legal frameworks, e.g. funding programmes to encourage specific technological research, it would be sensible to apply such instruments without creating new legislation. Even the WTO allows a form of trade restrictions "where the benefits to the contracting party or contracting parties concerned substantially outweigh any injury which may result to the trade of other contracting parties". These trade restrictions are tolerated especially when it comes to national security.⁶¹

In whatever way, the strategy must lead to a plan within a timeframe that corresponds with China's, which has a long-term view on its developments. As stated in its MiC2025 strategy, China aims for technological leadership in certain fields until 2049, the People's Republic of China's 100th anniversary. This stands in contrast with the short-term view that many international governments, industries, and businesses pursue. In addition, a riskier approach in

technological development regardless of its financial profitability has been recommended by experts.⁶² To lower the risks inherent to the aspiring goals of the EU strategy on defence technology cooperation, substantial long-term funding of relevant projects is necessary.⁶³ That might reduce a participating company's business risk of investing in uncertain technological research and development while supporting the extension of the European technology base and its defence and security capabilities.

Conclusion

Although China is a vital partner for the Austrian economy, the two countries' understanding of fair competition does not always coincide. Especially China's pressure on foreign companies to transfer key technology presents a distortion of competition. China furthermore follows its strategy of ultimately amalgamating its civil and military industries. As a consequence, not only every technological innovation is examined for its military applicability but a differentiation between civil and military defence companies is no longer possible. This carries the potential that Austrian companies of the security and defence sector with subsidiaries or Joint Ventures in China or being wholly or partially owned by Chinese companies directly strengthen China's military through transfer of technology, some of which even subsidised by Austrian public funding.

The economic cooperation between the two countries should not deliberately be disrupted in a major way, but a fresh risk assessment concerning technology transfers and the deduction of suitable measures are a strong recommendation. In addition, existing measures have to be scrutinized regarding their effectiveness to prevent technology transfers to China, such as export (e.g. EU regulation on dual-use item⁶⁴) and investment (e.g. Austrian Investitionskontrollgesetz⁶⁵) control mechanisms. Likewise, a review of the adequacy of public funding programmes and rules for international research and development cooperation is advised, aiming at driving innovation in key technology fields even more, according to the EU's strategy.⁶⁶ They should thus encourage interdisciplinary cooperation among public and private actors within the European Union, and abandon programmes that enable or permit unwanted technology transfers. As a consequence, through these measures, China's harmful acquisition methods would be limited and possible security implications for the EU of China's strategy to gain technological leadership reduced.

In order to expand Austria's technological basis, cooperation with actors of friendly and associated nations need to be encouraged. As a result of this, freedom of manoeuvre will be maintained for companies and research organisations with a

simultaneous reduction of risks related to technology transfer to China. In areas with key importance for Austrian and European security and defence, such as cybersecurity, semiconductors, and AI, even a de-coupling needs to be considered. Such a strategy can be individually adapted to the technology field concerned. At the same time, the pursuance of cooperation with Chinese research and development organisations and companies that provides a significant technological advantage for, but not a security threat to, Austria and the EU shall continue to be permitted.

With every technology transferred from Austria to China, however, it must be assumed that it is utilized by the Chinese military for enhancing its capabilities. Furthermore, such transfers disclose Austria's actual and potential security and defence capabilities.

About the Author

Christoph Strecker has several years of experience in financing international technological cooperations. He studied business administration with special focus on corporate finance and history in Vienna and Aarhus and holds a doctorate in history with his thesis focussing on the capital structure of the Austrian defence industry. In addition, he is a lecturer for risk management and finance at the University of Applied Sciences Burgenland and held talks at the Bundeswehr in Potsdam and the Theresian Military Academy.

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