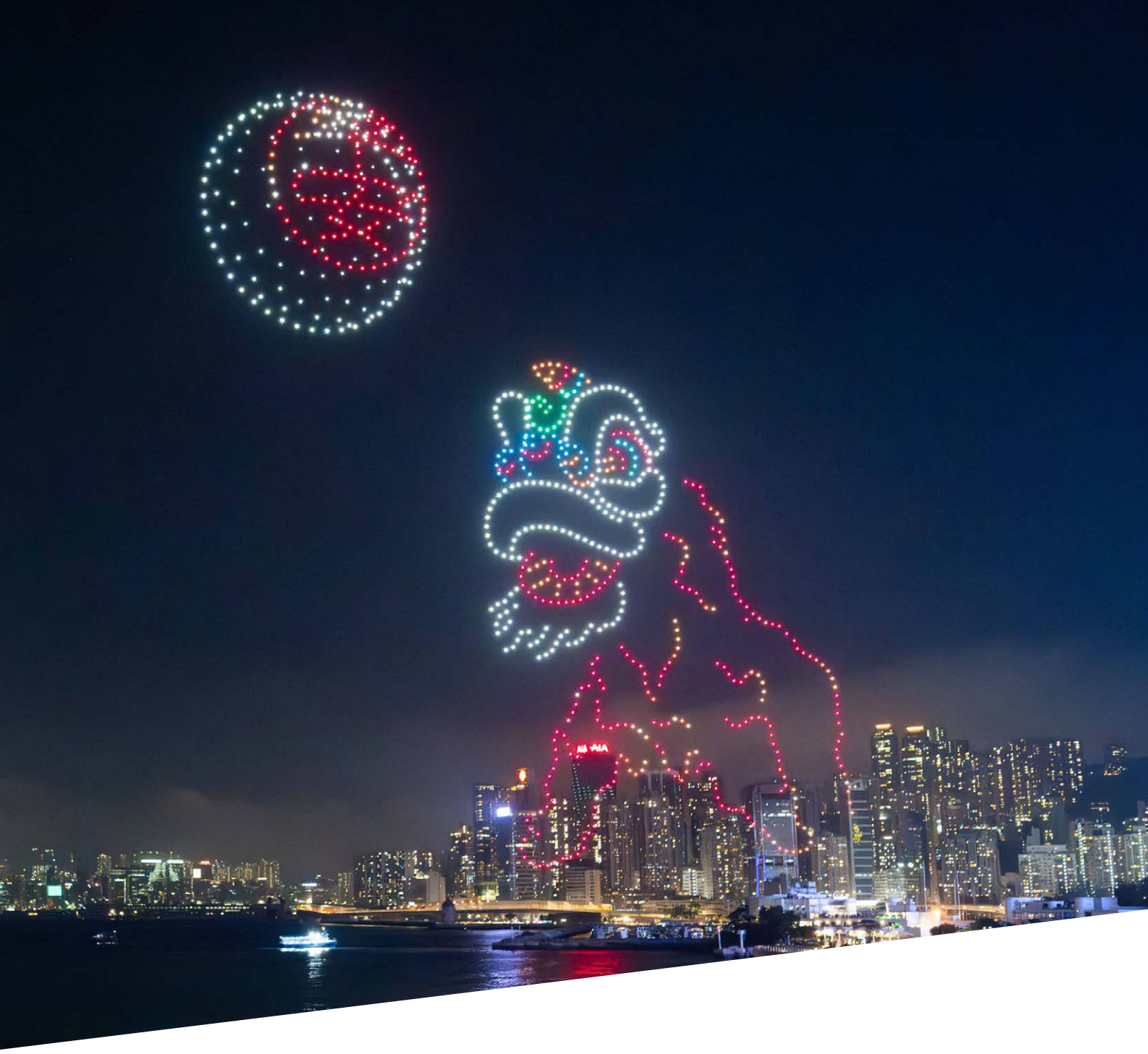

Analysis

# Flying With the Dragons

## China's Global Dominance in Civilian Drones and Risks for Europe

| T. Andersen |

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63/4 Narva Rd., 10120 Tallinn, Estonia
info@icds.ee, www.icds.ee

# List of Abbreviations

| | |
|---|---|
| **AAM** | advanced air mobility |
| **APAC** | Asia-Pacific |
| **APEC** | Asia-Pacific Economic Cooperation |
| **BRI** | Belt and Road Initiative |
| **BRICS** | Brazil, Russia, India, China, South Africa |
| **CAGR** | compound annual growth rate |
| **DJI** | Dajiang Innovations Technology |
| **DSR** | Digital Silk Road |
| **EIB** | European Investment Bank |
| **EC** | European Commission |
| **EU** | European Union |
| **FPV** | first-person view |
| **GACC** | General Administration of Customs |
| **IAM** | Innovative Air Mobility |
| **MIIT** | Ministry of Industry and Information Technology |
| **MCF** | Military-Civil Fusion |
| **MOU** | memorandum of understanding |
| **PRC** | People's Republic of China |
| **UAV** | unmanned aerial vehicle |
| **USA** | United States of America |

# Introduction

Over the last decade, civilian drones have proven their worth as invaluable dual-use assets with both civilian and military capabilities. Officially known as UAVs, civilian use cases of drones include aerial photography, environmental monitoring, infrastructure inspection, product deliveries, and also police operations in Xinjiang, China.[1] The military capabilities of civilian drones have been proven in Russia's war against Ukraine, with civilian drones in use by both sides and playing an indispensable role in the tactics of both armed forces and the wider conflict, causing the war to become the first full-scale drone war in history.[2] These smaller drones, able not only to conduct intelligence and harassment operations but also to play a role in informational warfare thanks to their onboard cameras, have become a key aspect of modern "techno-guerilla warfare".[3]

Policymakers in both Brussels and Beijing have recognised the importance of the industry, with Beijing's "Made in China 2025" plan laying out the need for the faster development of China's drone industry[4] and Brussels' "Drone Strategy 2.0" envisioning the key role that drones will play in future EU societies.[5] While many global powers have affirmed their commitments to becoming leaders in the technology, today, it is China that is the world's largest manufacturer and exporter of civilian consumer drones by revenue generated, with exports steadily rising. According to data from the GACC, the export of civilian consumer drones from China in 2020 amounted to about CNY 23.7 billion, or EUR 3 billion,[6] with Shenzhen-based company DJI manufacturing over 70% of the world's supply of civilian drones.[7] In the global drone market, currently led by China, worldwide revenue is expected to hit USD 4.3 billion in 2024, and the volume of worldwide drone sales is predicted to hit 9.3 million units in 2028.[8] By 2035, the AAM industry is expected to grow into a market worth USD 20.8 billion at a CAGR of 22.1%.[9]

*China is the world's largest manufacturer and exporter of civilian consumer drones by revenue generated*

Currently positioned as the global leader in civilian drone manufacturing, it is Beijing that is set to net the biggest gains from this emerging field, with its advantage translating into potential geopolitical influence in conflicts where the technology is utilised, increased power in international standards setting, and a lead in future technological developments in the industry. This analysis will examine the policies implemented by Beijing's drone industry, the potential risks for Europe, and the implications of Chinese drones in Ukraine.

# 1. Civilian Drones in the PRC

First implementing provincial-level subsidies in 2014 and then a nationwide pilot subsidy scheme in 2017, Beijing's civilian drone-related policies include a comprehensive range of measures that have spurred the development of drone technology in China and the proliferation of civilian drone usage

1 "大疆创新与新疆自治区公安厅结为警用无人机战略合作伙伴 [DJI and Xinjiang Autonomous Region Public Security Department form strategic partnership for police drones]," 无人机网 [Drones Net], 24 December 2017.

2 Samuel Bendett and Jeffrey Edmonds, "Russian Military Autonomy in Ukraine: Four Months In," Center for Naval Analyses, July 2022.

3 Tancrède Jankowski, "The Proliferation of Militarized Civilian Drones in Ukraine: a Lesson from the War for Western Military Staffs," Network for Strategic Analysis (NSA), 1 May 2023.

4 "国务院关于印发《中国制造2025》的通知 [Notice of the State Council on Issuing "Made in China 2025"]," 国务院 [State Council of PRC], 19 May 2015.

5 European Commission, "Drone Strategy 2.0: Creating a large-scale European drone market," 29 November 2022.

6 Markus Wagner, *Status Quo of China's Drone Industry: Market Development, Regulation and Application* (Beijing: Deutsche Gesellschaft für Internationale Zusammenarbeit, 2022).

7 Dario Constantine, "The Future of the Drone Economy," Levitate Capital, December 2020.

8 Statista, "Drones – Worldwide," last accessed 11 March 2024.

9 Ed Alvarado, "The Drone Industry's Journey Through 2023," Drone Industry Insights, 23 January 2024.

by individual consumers domestically and internationally.[10] The integration of drones into the national development agenda in plans such as "Made in China 2025" and Beijing's 14th five-year plan shows that the drone industry is one of Beijing's focuses in high-tech manufacturing in its bid for technological self-reliance. In order to spur on these plans, financial backing to boost drone demand has been provided via consumer-end drone subsidies ranging from city-level to provincial-level to national-level, which encourage wide-scale drone adoption, a prerequisite for Beijing to realise its long-term drone policy ambitions.. At the same time, investment capital has also been provided to Chinese drone companies via state-owned funds investing in domestic drone manufacturers.

*The drone industry is one of Beijing's focuses in high-tech manufacturing in its bid for technological self-reliance*

## 1.1. Long-Term Goals

Announced in 2015 by Beijing's MIIT, the "Made in China 2025" plan aims to shift China from being a manufacturer of cheap goods to becoming a manufacturer of high-end goods. This plan includes a document specifically focused on "Aviation Equipment" (including drones) that discusses the developmental environment of aviation equipment, progress since the 12th five-year plan, future focal points for development, and subsequent policies and measures. In summarising the domestic situation, the 2015 document notes that, at the time, the domestic aviation market was already huge in scale and that UAVs were entering the stage of rapid development. Referring to the global situation, Beijing highlighted that certain nations with more advanced aviation sectors had monopolised the industry, listing the USA as an example of a country which might use its technological advantages and monopolistic positioning to hinder the development of aviation industries abroad. Beijing, therefore, acknowledged the need for improvement in its own industry, which at the time was small in scope, limited in variety, and lagging in technology. According to the document, an important method for doing so would be to support domestic companies in "going global" through BRI ventures.[11]

Another key policy related to Beijing's drone ambitions is China's 14th five-year plan. Published in 2021, the plan includes a section on civil aviation development, which also refers to the development of drone technologies. This section emphasises the importance of "expanding scope and application", "regulatory enhancement", and "innovation in the drone industry", with the overall aim of broadening the utility of drones by integrating services into various areas of society across urban, rural, and remote regions. Policies to encourage this development include MCF, the establishment of UAV test zones and relevant economic clusters, and domestic regulation and international standardisation efforts.[12] Together, these two plans show that the development of civilian drone technology can be linked to Beijing's longer-term geopolitical aims, including increasing the PRC's international trade as part of the BRI and raising the PRC's standing in the international aviation industry.

## 1.2. Subsidies

At least fifteen separate drone subsidy programmes were implemented in China between 2014 and 2018. The subsidy programmes vary in scope and implementation, with the earlier programmes seemingly working on a per-drone basis, whereas the later programmes tended to work with a total spending cap per province – CNY 10 million annually.[13] After the 2014 launch of the first drone subsidy programme in Henan province, overseen by two departments of Henan's provincial government, further subsidy programmes were implemented in the provinces of Zhejiang, Jiangsu, Jiangxi, Fujian, and Xinjiang, followed by the launch of the first nationwide pilot scheme in 2017.

[10] Jessica Chung, "China's Agriculture Drone Revolution," Ipsos Business Consulting, April 2019.

[11] 中央人民政府 [Central Government of the PRC], "《中国制造2025》解读之：推动航空装备发展 [Made in China 2025: Pushing Forward in Aviation Components]," 12 May 2016.

[12] 中国政府网 [China Government Net], "“十四五”民用航空发展规划 ["14th five-year plan" Civil Aviation Development Plan]," 7 January 2022.

[13] CNY 10 million equivalent to approximately USD 1.5 million in September 2017.

| Month | Year | Location | Programme Details |
|---|---|---|---|
| Oct | 2014 | Henan province | - Subsidy programme initiated by Henan Agricultural Machinery Administration and Henan Finance Department<br>- Subsidies cover drones weighing 5–9 kg (10%), 10–34 kg (20%), and over 35 kg (60%) |
| Nov | 2014 | Zhejiang and Jiangsu provinces | - City-level subsidy programmes launched by Ningbo city (Zhejiang) and Yangzhou city (Jiangsu)<br>- Eligible recipients include individual farmers, farm cooperatives, and crop protection service providers |
| Jan | 2016 | Jiangxi province | - Provincial subsidy programme introduced by Jiangxi Finance Department & Agriculture Department<br>- Subsidies available for farmers, agricultural machinery cooperatives, and crop protection service providers (up to 50% of purchase prices of drones) |
| Dec | 2016 | Fujian province | - Provincial subsidy programme introduced by Office of Fujian Provincial Agriculture Department |
| Jul | 2017 | Changji county | - County-level subsidy programme initiated by Changji Agricultural Machinery Bureau<br>- Fund of RMB 2 million available for crop protection service providers and agricultural machinery cooperatives |
| Sep | 2017 | Nationwide | - China's Central Government launched nationwide pilot subsidy scheme<br>- Implemented jointly by the General Office of the Ministry of Agriculture, Ministry of Finance, and Civil Aviation Administration of China<br>- Maximum subsidy: 30% of drone price or RMB 30,000 per purchase |
| Nov | 2017 | Guangdong province | - Provincial subsidy programme introduced in Guangdong Province<br>- Up to RMB 10 million annually to subsidize drone purchase |
| Dec | 2017 | Anhui province | - Provincial subsidy programme introduced in Anhui Province<br>- Up to RMB 10 million in funding available |
| Jan | 2018 | Hunan province | - Provincial subsidy programme introduced in Hunan Province<br>- Up to RMB 10 million in funding available |
| Mar | 2018 | Jiangxi province | - Provincial subsidy programme introduced in Jiangxi Province<br>- RMB 10 million in funding available |
| May | 2018 | Chongqing municipality | - Provincial subsidy programme introduced in Chongqing Municipality<br>- Subsidies for drones with payload capacity of 10 liters and above |
| Jun | 2018 | Zhejiang and Jilin provinces | - Provincial subsidy programme introduced in Zhejiang and Jilin<br>- Maximum funding of RMB 10 million annually for each province |
| Sep | 2018 | Nationwide | - Extension of nationwide pilot subsidy scheme to additional provinces<br>- Maximum subsidy of RMB 30,000 per drone |

**Table 1. Agricultural Drone Subsidies in China between 2014–18**[14]

While it is difficult to quantify Beijing's total spending on drone subsidies between 2014 and 2018 due to policies being implemented and expiring at varying times, it is clear that both national and provincial governments have mobilised significant resources to provide financial backing to these plans. For example, if the CNY 10 million annual subsidy was implemented for a duration of one year in each of the PRC's administered 22 provinces and five autonomous regions, this would amount to a maximum annual total of CNY 270 million in subsidies.

Ultimately, these subsidies have increased the sales volume of drones in China, thereby encouraging the proliferation of drones across society and thereby increasing societal integration of the technology. Additionally, the increased demand for drones achieved through these subsidies might have played an important role in allowing manufacturers such as DJI to rapidly scale up production and achieve resulting economies of scale, providing them with a bolstered revenue stream that could be reinvested into further research and development activities.

[14] Chung, "China's Agriculture Drone Revolution."

| Month | Year | Policy Name |
|---|---|---|
| May | 2013 | Civil Aviation Industry Medium and Long Term Development Plan (2013–20) |
| Jan | 2017 | Notice of the General Office of the State Council on Printing and Distributing the "13th Five-Year Plan" for the Construction of the National Emergency Response System |
| Jul | 2017 | Next Generation Artificial Intelligence Development Plan |
| Dec | 2017 | Guidance on Promoting and Regulating the Development of Civil Unmanned Aircraft Manufacturing Industry |
| Aug | 2018 | Regulations on Management of Civil Unmanned Aircraft Pilots |
| Sep | 2018 | Overall Plan for Low-Altitude Flight Service Support System Construction |
| Nov | 2018 | Regulatory Conditions for Unmanned Aircraft Manufacturing Enterprises |
| Jan | 2019 | Guidance on Airworthiness Certification of Unmanned Aircraft Based on Operational Risks |
| Jan | 2019 | Consultation on Regulations for Light and Small Unmanned Aircraft Operations |
| Apr | 2019 | Zhejiang Province Civil Unmanned Aircraft Pilot |
| May | 2019 | Draft Guidance on Promoting the Development of Civil Unmanned Aerial Vehicles |
| May | 2019 | Guidance on Promoting the Development of Civil Unmanned Aircraft Pilots |
| Dec | 2020 | Five-Year Action Plan for Promoting the Construction of New Civil Aviation Infrastructure |
| Dec | 2020 | Opinions of the General Office of the State Council on Promoting the High-Quality Development of Weather Modification Work |
| May | 2022 | Guideline for Construction of Civil Unmanned Aerial Vehicle Test Base (Test Area) |
| May | 2023 | Interim Measures for the Administration of Unmanned Aerial Vehicles |

**Table 2. Key Domestic Policies Related to Drones in China[15]**

## 1.3. Policies and Investment

With regard to policies, Beijing has implemented at least 16 larger-scale drone-related policies between 2013 and 2023, with Beijing's 2013 "Civil Aviation Plan" being the first thereof and acting as a blueprint for future developments in the industry. The plan notes the need to accelerate the industrialisation and quality development of various aircraft types, including drones. Following this, other policies have been laid out to guide the development of drone technology and manufacturing domestically. Such policies have also tied this technology to other important developmental areas, such as artificial intelligence (AI) and agriculture. In Beijing's 2017 AI development plan, drones are mentioned five times, showing the coalescence of and overlap between drone technology and AI technology. The plan highlights autonomous system computing architecture, complex dynamic scene perception, real-time precise positioning, adaptive intelligent navigation for complex environments, autonomous drone control, and autonomous driving of cars, ships, and rail transit as key areas in which breakthroughs should be made. In the plan, Beijing says that it must apply AI in advantageous fields, including in the field of drones.[16]

Alongside implementing a range of policies to encourage and regulate drone adoption, Beijing has also invested in domestic drone companies indirectly via investment funds. In 2022, the Washington Post uncovered that DJI had received investment from four funds related to the Chinese government. However, as DJI is a privately held company, the ownership structure does not allow for a comprehensive list of its investors, and the scope of investment from other state-related investment funds, therefore, remains unknown.

[15] Zhongtai Securities, "无人机行业专题报告 [Drone Industry Special Report]," 11 July 2022.

[16] 国务院 [State Council of PRC], "国务院关于印发新一代人工智能发展规划的通知 [Notice of the State Council on issuing the development plan of the new generation of AI]," 20 July 2017.

| Fund Name | Description |
|---|---|
| China Chengtong Holdings Group | Directly administered by Beijing's State-owned Assets Supervision and Administration Commission (SASAC) |
| Shanghai Venture Capital Guidance Fund | Administered under the Shanghai Municipal Government |
| Guangdong Hengjian Investment Holding | Hengjian Holding is a holding company of Guangdong's Government, and Sensetime has been added to a US sanctions list |
| SDIC Unity Capital | Fund administered by the State Development & Investment Corporation (SDIC) |

**Table 3. Chinese State-Related Investments in DJI[17]**

## 1.4. Setting International Standards

As a nascent industry, the civilian drone industry is one in which international standards are yet to be fully established – Beijing has taken note of this and laid out its ambitions to play a role in this standard setting in its policy papers. The 3rd section of the 15th chapter in China's 14th five-year plan for aviation states that [domestic] support should be given to drones using the establishment of group standards in fields of application, thereby encouraging capable (domestic) enterprises to participate in the formulation of international (drones) standards".[18] This shows that Beijing views the drone industry not only as one of economic importance but also as one of long-term strategic importance in which it wants its domestic companies to have a significant voice in future developments.

Beijing's wish to formulate international technological standards extends beyond just drones, as is made evident by the mention of standards setting in the BRI, the PRC's flagship foreign policy initiative. Part of the BRI, the "Digital Silk Road" emphasises the need for international technological standards as an important measure to actively promote international cooperation in e-commerce under the BRI's framework. Having signed its first MOU on DSR cooperation in 2016 with Chile, as of September 2023, Beijing had signed bilateral DSR MOUs with 30 countries. The rapid implementation of this aspect of the BRI suggests that standards setting is a geopolitical policy priority for Beijing.[19] Setting international technological standards also ties into Beijing's "China Standards 2035" plan, which aims to set a blueprint for Chinese technological companies in standard setting both domestically and internationally. The plan mentions that China should deepen exchanges and cooperation in standardisation, especially with BRI countries and organisations such as BRICS and APEC, whilst also encouraging standardisation efforts regionally, for example, in North-east Asia, APAC, the Americas, Europe, and Africa.[20]

*Beijing's first-mover advantage in the drone industry, like in 5G, will give it increased leverage in influencing the setting of international standards*

Beijing's desire to formulate international standards in the drone industry should not come as a surprise and should be viewed instead as an extension of similar work it is already engaging in in industries such as 5G, in line with its ambitions laid out in the BRI's DSR and in its "China Standards 2035" plan. Beijing's first-mover advantage in the drone industry, like in 5G, will give it increased leverage in influencing the setting of international standards, especially in comparison to legacy industries where European and American standards are comparatively more prevalent. While Beijing's growing influence in international standards setting does not

[17] Cate Cadell, "Drone company DJI obscured ties to Chinese state funding, documents show," *The Washington Post*, 1 February 2022.

[18] 中国政府网 [China Government Net], ""十四五"民用航空发展规划 ["14th five-year plan" Civil Aviation Development Plan]," 7 January 2022.

[19] Lao Weiling, "推进"丝路电商"合作 先行发展"一带一路"数字经济 [Promoting the "Digital Silk Road" cooperation, developing the "BRI" digital economy]," 中国一带一路网 [Belt and Road Portal], 30 October 2023.

[20] 中央人民政府 [Central Government of the PRC], "中共中央 国务院印发"国家标准化发展纲要" [CCP Central Committee and State Council issue the "National Standardisation Development Outline"]," 10 October 2021.

necessarily need to be perceived as a threat to Europe in and of itself, Europe should certainly remain cautious of Beijing using its increased influence to create outcomes that are contrary to European interests and work proactively to counter such negative outcomes.

*Being a standard-setter in the drone industry could serve as a means for Beijing to reap a variety of benefits, economic and political*

Being a standard-setter in the drone industry could serve as a means for Beijing to reap a variety of benefits, economic and political. Economically, it would boost the market access of Chinese-manufactured drones around the world, as these products would naturally adhere to the standards promulgated by Beijing abroad. In turn, increased market access and increased export volumes could see Beijing improve its bilateral trade balances with trading partners, thereby deepening trade relations with partner countries and deriving increased export revenues for Beijing.

Politically, it would give Beijing the opportunity to engage in discussion and cooperation with other global powers involved in setting technological international standards related to UAVs, perhaps serving as a tool to improve Beijing's bilateral and multilateral diplomatic relations whilst increasing Beijing's presence at key international forums. Were Beijing able to act as a standard-setter across a variety of industries, this would naturally multiply the aforementioned economic and political benefits and could become an increasingly important geopolitical tool for Beijing. However, the approach that Beijing will take in this standard-setting is not yet fully clear, with top-down and bottom-up approaches both viable options.

Potentially, bolstering standardisation efforts within individual regions and organisations rather than globally – as the "China Standards 2035" plan suggests doing – could be perceived as a nudge from Beijing to move away from and provide an alternative to current international standards, of which the standard setting is largely led by the US and the EU, and towards regional standardisation programmes where Beijing may enjoy greater influence. From Beijing's perspective, US and EU dominance in international standards setting might be challenging to overcome by means of a top-down approach involving the biggest organisations at an international level, but it may be easier to chip away at with a bottom-up approach that involves regions and relatively smaller organisations. Whilst Beijing's "China Standards 2035" plan does not provide clear evidence to suggest that Beijing is aiming for dominance in international standards setting, its approach of working in individual regions and organisations around the world does go to show that Beijing is working to increase its influence in this area. Such an approach could help Beijing to create and strengthen a future digital divergence between US-led and China-led technological standards around the world, if it so wishes.

## 2. The EU's Perspective on Drones

The EC has laid out its 2030 drone vision in the EU's "Drone Strategy 2.0". This vision is important to the EU in retaining its position as a technological powerhouse globally, promoting European economic development, and aiding European defence.

*Drone technology is important to the EU if it is to be a leader in the global transition to a healthy planet and a new digital world*

Drone technology is important to the EU as it can help in making the twin "green and digital transition" that the EU requires if it is to achieve climate neutrality by 2050 and be a leader in the global transition to a healthy planet and a new digital world. Preceded by the EU's 2015 Aviation Strategy, "A Drone Strategy 2.0 for a Smart and Sustainable Unmanned Aircraft Eco-System in Europe" was launched by the EU in November 2022. "Drone Strategy 2.0" aims to contribute to the EC's "Sustainable and Smart Mobility Strategy" as well as the objectives of the "Action Plan on Synergies between Civil, Defence and Space Industries".[21] The vision sees drones becoming an integral part of life,

[21] European Commission, "Drone Strategy 2.0."

serving diverse civilian and defence needs, with the industry offering business opportunities in strategic civil-defence partnerships, creating jobs, safeguarding technology, and positioning EU companies as global leaders.

According to Adina Vălean, EU Commissioner for Transport, "[Drone Strategy 2.0] not only widens Europe's capacity to pursue large-scale commercial drone operations but also offers new opportunities, in particular to small and medium-sized enterprises. With the right framework in place, the drone services market in Europe could be worth €14.5 billion, and create 145,000 jobs, by 2030".[22] Indeed, at the launch of the Strategy, Vălean said that "Europe is already at the forefront" owing to its regulatory framework.[23]

However, according to the "Commission Staff Working Document on The Strategy", "Europe also lags behind both the US and China in total investment in drone services and number of vehicles respectively". The working document goes on to state that "although Europe has a developed drone industry, [a] significant part of [the] production of drones and critical components take place outside Europe" – including critical parts often produced in Asia such as "batteries, propellers, electric engines and sensors" – and highlights Europe's need to work to minimise this dependency, both on Asian suppliers and on Asian know-how, by manufacturing components domestically.[24]

While the EIB offers various forms of financial support to European drone projects, including sponsor equity, grants, funds, venture debt, mezzanine, and loans, there are no subsidies for consumer-end drone purchases, a significant difference from Beijing's approach to financing.[25] Instead, the EU has taken the approach of funding individual projects, with the EC funding 20 drone projects in 2021 alone.[26] However, funding individual projects is not necessarily conducive to a comprehensive and long-term financing strategy. Indeed, if the financing of these projects were genuinely effective, then the EU would not be lagging so far behind China in civilian drone manufacturing volume.

## 2.1. Risks Posed to Europe by Beijing

Chinese dominance in the civilian drone market poses a variety of potential risks of varying severity to European security as well as to European economic development. An increasing number of countries, aware of these risks, have been enacting partial bans on Chinese drones on a regional level. Three examples of this are Japan, the US, and India. In 2019, the Japan Coast Guard announced that it would cease using Chinese-made drones in 2020 over information security concerns.[27] In 2022, the US DOD listed DJI as a Chinese Military Company, exposing its products to various constraints in US domestic operations.[28]

*It seems that the EU might not be taking potential risks associated with using Chinese drones seriously enough*

In 2023, India banned domestic military drone manufacturers from using Chinese-made components.[29] The EU has yet to enforce any similar bans, although Chinese drones might pose significant risks to Europe's own drone ambitions, as well as its security given Beijing's policy of MCF. Within Europe, the Dutch Ministry of Defence has acknowledged that DJI data may be stored on Chinese servers, but the

[22] European Commission, "Drone Strategy 2.0: Creating a large-scale European drone market," 29 November 2022

[23] SESAR, "EU Drone Days - Launch of Drone Strategy 2.0 - 29 November 2022 - part 1 of 2," YouTube video, from 6:08, 6 December 2022.

[24] European Commission, "Commission Staff Working Document: EU Drone Sector state of play," SWD(2022) 366 final, 29 November 2022.

[25] European Investment Bank, "The EIB guide to finance for drone projects," January 2022.

[26] See Flying Forward 2020: Creating the 21st-Century Spatial Ecosystem.

[27] "Japan Coast Guard to 'eliminate' Chinese drones," *Nikkei Asia*, 9 December 2019.

[28] United States Department of Defense, "DOD Releases List of People's Republic of China (PRC) Military Companies in Accordance With Section 1260H of the National Authorization Act for Fiscal Year 2021," 5 October 2022.

[29] Krishn Kaushik, "Exclusive: India bars makers of military drones from using Chinese parts," *Reuters*, 8 August 2023.

| | EC 2030 Vision | Risks posed by Chinese civilian drones dominance |
|---|---|---|
| 1 | Drones and their required eco-system will have become an accepted part of the life of EU citizens. | EU citizens will be unable to accept Chinese drones in certain spheres of their life due to potential security risks and data concerns. |
| 2 | Drones will be used to provide services to the benefit of diversified civilian and defence end-users. | Chinese drones cannot securely provide services to defence end-users. |
| 3 | IAM services will provide regular transport services of passengers, ultimately aiming to fully automate operations, with drone services being integrated into existing transportation systems. | Potential interoperability concerns of Chinese drones with (sensitive) European systems, i.e., transportation and logistics. |
| 4 | An increased spectrum of distinct types of drones and use cases will coexist. | Chinese dominance in the drone industry may suppress European competition and innovation, as has happened in the solar PV industry, decreasing drone variety and use cases. |
| 5 | The current U-space regulatory framework will have been completely rolled out in the EU. | No significant risk. |
| 6 | The EU drone industry will become viable and accessible to EU citizens and businesses. | No significant risk. |
| 7 | Civil-defence industry synergies will be systematically identified and exploited. They will improve the competitiveness of European industry and strengthen Europe's strategic autonomy, by allowing Member States to rely on competitive drone technology of European origin. | EU military drone projects can only benefit from innovative developments emerging from European civilian drone SMEs, not from developments in Chinese civilian drones; therefore, lacking development in European civilian drones will have a negative impact on domestic defence capabilities. |
| 8 | The drone eco-system will provide jobs and allow for growth opportunities for the EU economy as whole, enabling European companies, including new SMEs to grow and flourish as global leaders. | European companies will not flourish globally in a market dominated by Chinese companies, as has happened in the solar PV industry, meaning less EU jobs directly in the drone industry. |

**Table 4. Risks to Europe's Drone Ambitions[32]**

Dutch police continue to use DJI drones despite this fact.[30] As opposed to implementing bans, in 2022, European institutions granted DJI the world's first C1 Drone Certificate – an EU examination certificate for drones issued under the new European Drone Regulation.[31] Based on these facts, it seems that the EU might not be taking potential risks associated with using Chinese drones seriously enough, perhaps due to a lack of clarity on what the risks themselves actually are. These risks are described in Table 4.

Overall, Beijing's long-term policies, regulations, and investments have created an environment in which the development of drone technology and its hardware manufacturing has been able to thrive in China – a phenomenon which Europe has arguably replicated to some extent in terms of technological development but not in manufacturing at scale. This situation is well summarised by Mario Draghi, who said at the High-level Conference on the European Pillar of Social Rights in Brussels on 16 April 2024: "In Europe, we are traditionally very strong in research, but we are failing to bring innovation to market and upscale it. We could address this barrier by, among other things, reviewing current prudential regulation in bank lending and setting up a new common regulatory regime for start-ups in tech."[33]

*European weakness in civilian drone manufacturing could also be a worrying sign for Europe's military drone technology*

If the two are correlated, European weakness in civilian drone manufacturing could also be

[30] "Dutch police using Chinese-made DJI drones the Defense Ministry rejected over security concerns: report," *NL Times*, 30 September 2021.

[31] DJI, "DJI Granted World's First C1 Drone Certificate," 18 August 2022.

[32] European Commission, "A Drone Strategy 2.0 for a Smart and Sustainable Unmanned Aircraft Eco-System in Europe," COM(2022) 652 final, 29 November 2022.

[33] Mario Draghi, "Radical Change – Is What Is Needed," (speech at the High-level Conference on the European Pillar of Social Rights, Brussels, 16 April 2024), Groupe d'études géopolitiques.

a worrying sign for Europe's military drone technology. In China, there does seem to be a positive correlation, with Beijing leading the world not only in civilian drone exports but also in exports of armed drones. China is the world's leading exporter of armed drones, having made exports to at least eleven countries, with sales particularly strong in Egypt, Iraq, Jordan, KSA, and the UAE, while other nations procuring Chinese combat armed drones include Algeria, Pakistan, Uzbekistan, Myanmar, Turkmenistan, and Nigeria.[34] While it is true that the correlation between military and civil capacity is likely particularly strong in China due to MCF, there is certainly also a non-negligible correlation in Europe, given the EU's desire for strategic civil defence partnerships. If the civil and military drone development in Europe is indeed correlated, then European civilian drone technology should not only be viewed as a civilian priority but also a military one.

# 3. Chinese Drones in Russia's War against Ukraine

Russia's war against Ukraine, the first full-scale drone war in history, has evidenced the power of both civilian and military drones on the battlefield. DJI's technology has played an important role on both sides of the conflict but especially for Ukraine, with Ukrainian Prime Minister Denys Shmyhal claiming in 2023 that Ukraine had been buying up to 60% of DJI's global output of the Mavic quadcopter and Kyiv estimated to have received "millions" of Chinese-made drones and spare parts, primarily from European intermediaries.[35] During the war, Ukraine has been estimated to be using up to 10,000 drones per month.[36]

## 3.1. Beijing Export Controls

In an effort to decrease the usage of DJI drones in the war, on 31 July 2023, Beijing announced drone export controls limiting the volume of drones that Ukraine (and Russia) could legally obtain directly from Chinese sellers.[37] However, the dual-use nature of civilian drones means that sellers are often unable to distinguish whether dual-use civilian drones will be used for civilian or military purposes, and Ukraine was, therefore, able to continue buying drones from third parties outside China. However, Ukraine's ability to purchase individual drone parts from China did suffer setbacks, therefore leading to negative consequences for Ukraine on the battlefield.[38] The reports discussed above show that the export control did cause Ukraine to suffer limited setbacks in acquiring civilian drones and relevant parts, while Russia has not been reported to suffer such setbacks, suggesting a possible difference in how the law has been implemented in relation to the two countries.[39] Overall, the difficulty in implementing and tracking the effectiveness of such laws highlights the extent to which dual-use items, such as civilian drones, exist in legal grey areas.

*While Ukraine has been buying Chinese civilian drones through intermediaries, Russia has been receiving drones from Beijing directly*

## 3.2. Russia Receiving Drones from Beijing

While Ukraine has been buying Chinese civilian drones through intermediaries, Russia has been receiving drones from Beijing directly. On 16 October 2023, Russian Finance Minister Anton Siluanov said, "Today, almost all drones come from the PRC. We are grateful to our partners". Politico corroborated the fact that Russia has secretly been receiving drones from Beijing, with an analysis of Chinese customs data

[34] Atul Chandra, "Why China's armed UAVs are a global export success, and its fighter jets, not so much," *Defence Procurement International*, 5 November 2021.

[35] Elisabeth Gosselin-Malo, "Ukraine continues to snap up Chinese DJI drones for its defense," *C4ISRNET*, 23 October 2023.

[36] Erin Snodgrass, "Russia and Ukraine are filling the sky with drones. There are so many buzzing around over eastern Ukraine, they're actually crashing into one another: report," *Business Insider*, 30 August 2023.

[37] 商务部 [Ministry of Commerce of the PRC], "商务部 海关总署 国家国防科工局 中央军委装备发展部公告 2023年第28号 关于对部分无人机实施临时出口管制的公告 [Announcement No. 28 of 2023 from the Ministry of Commerce]," 31 July 2023.

[38] Vitaly Shevchenko, "Ukraine fears drone shortages due to China restrictions," *BBC*, 22 October 2023.

[39] DJI Announced that stopped selling drones in Russia but Russia still uses DJI complexes to detect drones of the Armed Forces of Ukraine, see Leave-Russia, "DJI," last accessed 11 March 2024.

published in July 2023 finding that China had sold drones to Russia, totalling more than USD 100 million in worth.[40] While the proportion of military and civil drones included in this sales figure remains unclear, the evidence suggests that Beijing has provided both types to Russia. Evidencing civilian drone sales are a number of Russian drone training centres that have launched courses for FPV drone pilots and which have clear links to Russia's ongoing war.[41] [42] As for Russia's military drones, aside from the "Shahed-136" and "Shahed-131" military drones coming from Iran, the remaining 67% of Russia's critical military drone component imports have come from China during the war, showing Beijing's military support to Moscow in this area. Furthermore, comparing country of delivery and origin for military drone components arriving in Russia, components actually manufactured in China comprise only 85–90% of components delivered from China, figures that highlight Beijing's role also as an intermediary in delivering drone components to Moscow from third countries.[43] In a comparison of Chinese exports to the two countries, European Pravda put the figure for Chinese drone exports to Russia at 30 times the number for Ukraine.[44] In summary, while China has not provided any military drone parts to Ukraine, it has done so to Russia and has, in fact, been Russia's single largest component supplier during the war – an action not in line with Beijing's proclaimed "neutrality".

## 3.3. Drones in the War in 2024

In 2024, drones continue to play a key role in the war. In February this year, President Zelenskyy signed a decree effectively establishing a separate drone division in the Armed Forces of Ukraine, known as the Unmanned Systems Forces, going on to say that "drones – unmanned systems – have proven their effectiveness in battles on land, in the sky and at sea".[45] This decree and FPV videos of Ukrainian "kamikaze" drones provide mounting evidence for the technology's value on the battlefield. Partially in response to Beijing's export controls and partially due to a lack of drone supplies from allies, Ukraine has been pushing to make more drone components domestically.[46] As of 2024, there are around 200 companies producing drones in Ukraine, compared to only seven companies in 2023.[47] Given the EU's lack of support for Ukraine in this area, this move can be seen as a strategic necessity for Kyiv.

## 3.4. EU Weakness in Assisting Ukraine: Future Implications

Ukraine's establishment of a separate drone unit in its armed forces and its ambitious drone production goals go to show the importance of drones not only in this conflict but also in modern warfare more generally. However, the EU has not been able to assist Ukraine in any meaningful way in procuring drones, as evidenced by Ukraine's reliance on Chinese drones and its being forced to begin its own domestic drone manufacturing. This denotes an EU-wide weakness – the inability to back Ukraine in a key military technology.

*The EU has not been able to assist Ukraine in any meaningful way in procuring drones*

If the EU had been able to provide a steady and low-cost supply of civilian drones readily available for Ukraine's defensive efforts, Ukraine might have achieved a more advantageous and stronger position on the battlefield from

[40] "Today, all drones come from China": Russia's Finance Minister publicly acknowledges where they get UAVs from," *Ukrainska Pravda*, 16 October 2023.

[41] Molfar OSINT Agency, "China's method of avoiding sanctions by supplying drones to Russia: schemes, legal entities and training centers," last accessed 11 March 2024.

[42] Reid Standish, "Chinese Drones Flow To Training Centers Linked To Russian War In Ukraine," *Radio Free Europe / Radio Liberty*, 5 October 2023.

[43] Olena Bilousova, Nataliia Shapoval and Vladyslav Vlasiuk, "Strengthening Sanctions on Foreign Components in Russian Military Drones," Freeman Spogli Institute for International Studies at Stanford University, 23 August 2023.

[44] "China Secretly Sells Drones to Russia Worth over $100 Million – Politico," *European Pravda*, 24 July 2023.

[45] Volodymyr Zelenskyy (President of Ukraine), "I signed a decree initiating the establishment of a separate branch of forces – the Unmanned Systems Forces – address by the President of Ukraine," (speech), 6 February 2024.

[46] Max Hunder, "Ukraine races to make more war drone components at home," *Reuters*, 9 October 2023.

[47] Cabinet of Ministers of Ukraine, "Prime Minister: Our key task is to intensify production of drones, ammunition and other modern weapons," 1 February 2024.

which to continue fighting. However, the EU has no cost-effective answer to China's DJI, and therefore, Ukraine must fight an uphill battle in acquiring Chinese drones, which is increasingly difficult owing to Beijing's export bans.[48] At the same time as Kyiv fights an uphill battle in acquiring civilian drone technology from China via third parties, Chinese companies and intermediaries continue supplying crucial military drone components to Russia.

Looking ahead, Ukraine's ramping up of its own drone production capacity is a major achievement that is potentially significant for European defence beyond the current war. However, even if Ukraine is able to make up for Europe's shortcomings concerning drones in the future, these shortcomings nonetheless indicate a strategic vulnerability in European defence and could be a factor that emboldens Russia to engage in further conflicts on the European continent in the coming years.

## Conclusion

Having fostered a domestic company to become the leader of the global civilian drone market, Beijing's policies have served well in developing this high-tech industry domestically and also in making it a success globally. While the EU has also implemented a number of drone-related policies, provided financing, and laid out a framework for its drone vision, its domestic drone companies remain uncompetitive with China's, even in Europe. This may be explained in part by the EU's focus on building up a well-regulated drone ecosystem rather than encouraging local technological development, building up supply chains, and hardware manufacturing at scale. As Mario Draghi has put it, "domestic manufacturing in the most innovative and fast-growing sectors" is key to transformation across the European economy.[49]

The lack of domestic manufacturing in the industry to date has put the EU in a disadvantageous position, where it has not been able to support Ukraine with a technology that has become key in defending against Russia's war. Heading towards a potential Trump presidency, which could see stress put on transatlantic relations, it is of more importance than ever that Europe has a domestic capacity that it can depend on. On a more positive note, it could be argued that the EU's neglect of this space has been a factor in spurring Ukrainian drone manufacturing and innovation, potentially giving Ukraine an important future role in contributing to European defence and security with drone manufacturing so long as it can continue making leaps in the technology and continually increase its manufacturing capacity.

The technological advantage that Beijing now has in the drone industry positions it as an increasingly important player in the setting of international technological standards, within the drone industry itself but also beyond. This gives Beijing an opportunity to increase its geopolitical strength via the DSR and potentially diminish the EU's importance as a setter and regulator of international technological standards.

*The drone industry is one of many in which Beijing has become a technological pioneer and one in which the EU is arguably showing a degree of complacency and inefficiency*

In conclusion, the drone industry is one of many in which Beijing has become a technological pioneer and one in which the EU is arguably showing a degree of complacency and inefficiency. This perhaps reflects a wider issue in EU industrial and geopolitical strategy, where not enough focus is placed on technological advancements, and measures to push technological advancements at scale are not effectively advanced. In a world where the trend of onshoring key technologies and relevant manufacturing continues to grow, the EU must be careful not to be left behind, as this could constitute a significant risk to its defensive and economic security in the future.

[48] Joe McDonald, "China restricts civilian drone exports, citing Ukraine and concern about military use," *AP News*, 1 August 2023.

[49] Draghi, "Radical Change – Is What Is Needed."

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63/4 Narva Rd., 10120 Tallinn, Estonia
info@icds.ee

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