

APRIL 2024

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*The State of Russia's Defense Industry after Two Years of the War*

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A Report of the CSIS Europe, Russia, and Eurasia Program

**CSIS** | CENTER FOR STRATEGIC &  
INTERNATIONAL STUDIES

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# Acknowledgments

Special thanks and recognition to Samuel Bendett, whose expertise, direction, and insight were vital to the production of this report.

This report has strongly benefited from comments by Pavel Luzin, Dara Massicot, Elina Ribakova, Paul Schwartz, and Anton Shvetz. The research team is deeply thankful for their feedback.

This report is made possible by a grant from Carnegie Corporation of New York.

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# Introduction

As Russia's full-scale invasion of Ukraine drags into its third year, Russia's defense industry has found ways to get what it needs to ramp up arms production. The Kremlin still relies on foreign components to fuel its war effort. But it has been able to maneuver around the Western sanctions regime by turning to countries willing to supply its defense sector or by using complex cut-outs to acquire Western components indirectly. With these parts and components secured, Russia has been able to leverage its sizable weapons stockpiles built up over the Cold War period. These stockpiles of aging and often outdated equipment have enabled the Russian defense industry to overhaul and modernize older platforms quickly and at lower cost. Russia has also claimed to have increased production of some newer weapons systems entirely from scratch. In both cases, whether refurbishing older or producing brand new systems, the Kremlin has continued to rely on foreign components imported via a complicated network of intermediaries. This has proved critical to sustaining the Russian military in Ukraine.

This report is a follow-up to the April 2023 report *Out of Stock? Assessing the Impact of Sanctions on Russia's Defense Industry*.<sup>1</sup> Last year's report concluded that, during the first year of the war, sanctions created shortages of higher-end foreign components, while Moscow's efforts at state-backed import substitution were largely limited. The sanctions affected Russia's ability to manufacture, sustain, and deliver advanced weapons and technology to the battlefield in Ukraine. The report said the war would stress Russia's military industrial base, already stretched thin by sanctions and high battlefield losses during the first 12 months of the invasion.

What has changed in a year? As last year's report warned, the Kremlin still possessed a significant degree of adaptability to Western sanctions and could take advantage of its prewar stockpiles of older equipment as well as countries' willingness to supply Moscow with restricted dual-use items and technology. That has indeed been the case. Using global supply chain data, the 2024 report analyzes the flow of restricted goods to Russia and the latter's procurement priorities. This analysis shows that Russia remains dependent on foreign components and technology but has shifted its procurement patterns, with more military goods flowing into Russia now being sourced from civilian or dual-use suppliers. The report also demonstrates the depth and breadth of China's support for Russia's war effort, which, while not providing weapons directly, has enabled the ramp up of Russia's defense industrial base to the detriment of Ukraine.

As a result, two years into the war, Russia's prospects have improved. Russia has successfully adapted its military and defense industry to minimize the impacts of the Western sanctions regime. The Kremlin has ramped up domestic production of weapons and equipment and thus has kept its army relatively well supplied. It has solidified defense ties with China and Iran and has even imported large amounts of military equipment from North Korea. Russia still relies on its older refurbished weapons stockpiles, and goods that come from its new suppliers are of lower quality than their Western alternatives, as last year's report predicted. However, and similarly matching predictions from last year's report, the current war of attrition in many cases does not require sophisticated high-end weapons systems and instead may be fought with large amounts of relatively cheap munitions (as demonstrated in the sections below). Therefore, Moscow's efforts to reinvigorate its defense industry, coupled with the current pace of the war and the six-month-long Western stagnation of Ukraine aid, have ultimately translated into direct Russian battlefield successes.

Still, Russia's defense industry faces a number of unresolved issues, which have been exacerbated by the protracted war and sanctions and can negatively impact performance of the Russian Armed Forces in Ukraine. Among these issues are an underdeveloped military high-tech industry, corruption in the area of military procurement, an overheating economy, and labor shortages due to war-induced migration and attrition.

The following report details Russia's evolving defense industrial capabilities and limitations during the second year of the war (February 2023-February 2024) and how these changes have affected and will continue to affect battlefield outcomes in Ukraine. Thematically, the report is divided into four main parts, which combined provide a holistic picture of Russia's defense industry:

- 1. The state of Russian weapons systems in 2023:** The report starts with a brief overview of Russia's domestic arms production efforts throughout 2023, followed by a detailed examination of key Russian weapons systems (such as tanks, artillery, drones, missiles, and electronic warfare systems) and their changing roles on the battlefield.<sup>i</sup>

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<sup>i</sup> An important caveat in this regard is that, for lack of alternative sources, some parts of the report cite numbers published by the Kremlin and the Russian state media, and hence the data on the actual levels of Russian military industrial production are inevitably impacted by such sourcing. However, general trends and conclusions are confirmed by other evidence obtained through Ukrainian and international observers.

- 2. Russia's evolving import diversification efforts:** The report then looks into the defense industrial capabilities Russia is now prioritizing to adjust to the Western sanctions regime. In doing so, CSIS tracked Russia's general procurement dynamics and the efforts of Russian companies affiliated with the Kremlin's war machine. This part of the report thus identifies the imported components and weapons categories that Russia's defense industry has particularly relied on in the second year of the war and includes a case study on China to illuminate Russia's evolving procurement patterns.
- 3. Existing Russian military industrial limitations:** This part of the report dives into analysis of the Kremlin's remaining weaknesses, which have been aggravated by a long war of attrition and which can have both short- and long-term effects on its military.
- 4. Russia's strategy in Ukraine in 2024:** The final part of the report assesses how Russia's performance throughout 2023 and its evolving defense capabilities might be translated into its offensive posture in Ukraine in 2024. This part of the report is followed by recommendations to Western policymakers on how to counter the Kremlin's war effort by capitalizing on the Russian military's existing vulnerabilities.



# Part I

## *The State of Russian Weapons Systems in 2023*

### **Russian Figures on Increased Defense Production**

In 2023, a relatively favorable economic situation enabled the Kremlin to keep boosting domestic arms production. Russia's ability to continue shipping most of its crude oil while bypassing the G7's oil price cap, coupled with a favorable oil price dynamic, allowed it to sustain increased defense spending, which in turn became the main driver of its economy.<sup>2</sup> Additionally, technocrats steering the Russian economy have proved capable of managing the impact of sanctions, softening the war's overall immediate and short-term effects on the majority of the population.<sup>3</sup>

In this context, Russia accelerated weapons production capacity of its defense industrial sector by employing a number of state-run or affiliated military and civilian factories. However, before discussing general Russian defense production trends and numbers throughout 2023, it is worth highlighting that, due to the lack of independent open-source data, many Western observers have relied on the defense production figures reported by the Russian Ministry of Defense (MOD) and other Kremlin-linked sources. This report also cites those figures to showcase the Russian MOD's ongoing activities and plans going forward (even if the numbers provided are likely inflated).

One important takeaway coming from Rostec, a state-owned defense conglomerate, is that the company and its subsidiaries were ordered to accelerate the pace of production for all kinds of weapons systems by multiple times ahead of the 2023 Ukrainian counteroffensive and are expected to expand even further in 2024. According to Rostec, in 2023 it increased overall production of tanks 7 times, light armored vehicles 4.5 times, and artillery and multiple launch rocket systems 2.5

times. The chief executive officer (CEO) of Rostec also said the company ramped up manufacturing of certain types of ammunition by as much as sixtyfold.<sup>4</sup>

In addition to boosting arms production, Russia reportedly increased output for components—such as computers, electronics, and optical systems—that play a vital role in construction of different weapons systems from tanks to missiles. According to the Russian Federal State Statistics Service (Rosstat), production of these products between January and November 2023 increased by almost 35 percent compared to the same period in 2022.<sup>5</sup> Official statistics have also claimed that production of remote-control equipment, including for guiding uncrewed aerial vehicles (UAVs), has increased around 80 percent annually.<sup>6</sup> Similarly, Denis Manturov, deputy prime minister of Russia, boasted about a 58 percent growth rate in domestic production of machine tools.<sup>7</sup>

In late December 2023, the Russian MOD announced that throughout the past year the military received more than 1,500 tanks, 2,200 armored combat vehicles, 1,400 missiles and artillery weapons, and 22,000 UAVs.<sup>8</sup> While impressive, the authors believe these numbers to be inflated. Additionally, it is difficult to estimate what share of these weapons was produced locally from scratch, what share was refurbished, and what share was imported from third countries willing to do business with Russia. Still, these MOD figures paint a picture of a reinvigorated domestic defense industrial sector capable of replenishing its military with new and modernized weapons.



*Military vehicles are pictured at a Russian plant, January 18, 2023.*

Photo: Ilya Pitalev/Sputnik/AFP via Getty Images

The Russian government projections for 2024 include similar messaging. Russia's national defense spending in 2024 will total 10.8 trillion rubles (\$109 billion), which means that for the first time in the country's post-Soviet history, 6 percent of its gross domestic product (GDP) will be spent on the military (compared to 3.9 percent in 2023).<sup>9</sup> Defense spending will exceed social spending, accounting for nearly a third of Russia's total budget expenditures for the year.<sup>10</sup> This is reflected in the Russian MOD's ambitious claims that defense industry organizations are expected to supply Russian forces with "more than 36,000 basic types of military equipment, 16.5 million weapons, and more than one million units of portable weapons, personal armor protection, and communications equipment," allegedly exceeding the same figures for 2022 and 2023 by several factors.<sup>11</sup>

While, as mentioned above, the official data and statements coming from the Russian MOD are most likely exaggerated, and therefore should be taken with a grain of salt, they demonstrate the Kremlin has placed renewed emphasis on strengthening the domestic defense industrial sector. To do so, the government claims to have increased the number of defense workers, with some state-run plants and factories transitioning to a 24-hour shift schedule; simplified the procedure for concluding contracts with the Russian MOD for development and production of military products; and shortened the required timeline for selecting components and testing new weapons, among other things.<sup>12</sup> The MOD also claims to have implemented a system of interdepartmental coordination to monitor and organize the work of defense industrial enterprises and respond to issues arising during production and repair of military equipment.<sup>13</sup> It is likely that Russia will proceed with these efforts in 2024.

## **Key Weapons Systems Used in Ukraine**

Two years after the invasion, the overall picture for the Russian military posture has become more complex. Russia has shown resilience and adaptability to continue pressuring Ukraine on the battlefield: it has adapted to Ukrainian tactics; absorbed manpower losses while continuing to field more and more soldiers; and—as the previous section demonstrates—reinvigorated its domestic arms production, building new and refurbishing older weapons and technologies. These measures have yielded enough effect to stalemate Ukrainian efforts to advance and break through the Russian positions.

More precisely, this high-intensity war of attrition has prioritized certain lower-cost and lower-quality weapons like less advanced tanks, armored vehicles, artillery, small drones, and kamikaze UAVs that Russia continues to field in large numbers and that are proving effective. By contrast, more high-tech Russian weapons, such as advanced aircraft and helicopters, have proved vulnerable to Ukrainian countermeasures, leading the Russian military to withhold deploying these systems on the battlefield. Similarly, advanced Russian missiles have fallen prey to Ukrainian interceptors and are in short supply due to a high rate of usage.

This section provides an overview of the key weapons categories used by Russian forces in Ukraine, analyzing the evolving role they have been playing on the battlefield and highlighting systems that were especially critical to Russia's war effort throughout 2023.

## Tanks

Throughout 2023, the Russian military continued to rely on its tank force, reportedly receiving more than 1,500 tanks (approximately 125 per month) and losing somewhere between 600 and 874 (approximately 50-73 per month), based on different estimates.<sup>14</sup> While these open-source data suggest Russian tank production has increased, allowing the Russian army to maintain a large tank force despite continued losses of these vehicles, the analytical community also believes the 1,500 tanks delivered last year likely included a number of refurbished tanks from the battlefield as opposed to new-build hulls and turrets.<sup>15</sup> For instance, one NATO official recently claimed that about 86 percent of the main battle tanks (MBTs) Russia produced in 2023 were refurbished. While Moscow has been estimated to maintain 5,000 tanks in storage, the official noted that “probably a large percentage of those can’t be refurbished and are only good for cannibalizing parts.”<sup>16</sup> Another open-source analysis examining satellite imagery has argued that Russia has removed between 25 to 40 percent of its tank strategic reserves from open-air storage facilities since 2022.<sup>17</sup>

Visual evidence coming from the battlefield confirms this reporting, showing Russia deploying its 60-year-old T-62 tanks and 70-year-old T-55 tanks against the Ukrainian forces.<sup>18</sup> As the overall quantity of old Soviet tanks in Russian storage likely remains in the several thousands, the Russian MOD can field such vehicles over the course of many months in 2024, assuming they can be refurbished and are not awaiting dismantlement.<sup>19</sup> Public analysis of the Ukrainian battlefield shows that some of these Russian tanks received upgrades such as new radios, modern optics, and additional layers of reactive armor, with the most common upgrade to both newer and older Russian tanks being the anti-drone metal cages and slat armor, often referred to as “cope cages.”<sup>20</sup> According to CSIS’s Mick Ryan, “These cages have helped either crush the fuses of Ukrainian antitank weapons before they hit a vehicle’s main armor or forced antitank weapons to detonate before they can penetrate the vehicle.” The cages have provided an additional layer of physical protection to Russian tanks, thus giving the Russian soldiers more confidence to operate in places with a high risk of Ukrainian drone attacks.<sup>21</sup>

However, visual evidence also suggests that the “cope cages” may not be universally applied. Some of the other older tanks, for instance, have no discernible upgrades and have been mainly used not for frontline combined arms mechanized assaults but as artillery and self-propelled howitzers.<sup>22</sup> This shift, while already underway due to the general effectiveness of Ukrainian anti-tank guided missiles (ATGMs), was accelerated by the rapid emergence of first-person view (FPV) drones in significant numbers, which have the capacity to attack any vehicle on the battlefield, and by tanks’ vulnerability to these cheap and expendable systems.

The situation may change if Russia manages to accelerate production and deployment of more advanced tanks on the battlefield. Uralvagonzavod, Russia’s largest tank manufacturer under the umbrella of Rostec, is expected to be the main driver of this effort by ramping up production of T-90 and T-80 tanks as well as the Terminator 2 tank support combat vehicles and TOS-1/TOS-2 multiple rocket launchers. In November 2023 the CEO of Uralvagonzavod stated that the company, per the Russian military’s request, was even considering producing the T-80BVM MBTs entirely



*President Vladimir Putin visits Uralvagonzavod, the country's main tank factory, February 15, 2024.*

Photo: Ramil Sitdikov/AFP via Getty Images

from scratch.<sup>23</sup> Later reporting on this topic indicated that Russia managed to produce new variants of not only T-80BVM MBTs but also T-72B3M MBTs.<sup>24</sup>

Overall, judging from the above-referenced data, Russian forces will likely continue utilizing older tanks throughout 2024, given that they are available in large numbers and thus can be relatively quickly and easily replenished. However, as these vehicles generally come with less protection and are vulnerable to drones and ATGMs, Russia will probably continue to use them mainly as mobile artillery. While the Russian MOD is trying to boost production of more advanced variants such as the T-90, T-80, and T-72 MBTs, it is not yet known if this effort will yield the intended results.

## **Artillery Systems**

Russian military artillery has been used to devastating effect, with Russian systems firing thousands of shells daily across the entire front.<sup>25</sup> Western military analysis points to the improving situation with artillery systems production and refurbishment, as well as delivery and use at the front. In 2022, the Russian industry quadrupled 152-millimeter (mm) artillery round production, manufacturing one million rounds. This was achieved by reallocating production capacity from other shell calibers. To increase the quantity of ammunition produced, Rostec took control of 15 enterprises at the start of 2023. Today, the Russian military fields an estimated 4,700 barrel artillery systems, including the 2S19 howitzer and other systems that fire 122 mm and 152 mm rounds.<sup>26</sup> The Russian military may also have as many as 1,100 multiple launch rocket systems.<sup>27</sup> Rostec also indicated in December 2023 that it is testing the new Koalitsiya-SV self-propelled artillery. Its mass production has already started and there will likely be a growing number of these systems deployed in Ukraine.<sup>28</sup>

Overall, according to the Royal United Services Institute (RUSI), Russian artillery use in Ukraine indicates that it is a capable component of the Russian military. It has a significant ability to

find and strike targets over a wide area and likely retains the ability to mass fire against targets of opportunity.<sup>29</sup> Russian artillery forces are continuing to build on their reconnaissance-fire contour, with aerial drones providing intelligence, surveillance, and reconnaissance (ISR) and target acquisition information to enable artillery systems to strike identified coordinates quickly and often with relative precision. At the same time, there are growing indications among Russian military commentators about the ability of Russian artillery systems to evade and escape Ukrainian counterbattery fires. In addition to self-propelled howitzers, the Russian military has close to 7,500 towed artillery pieces overall, down from approximately 12,000 stored towed pieces two years ago, indicating that Russian forces may be cannibalizing older barrels to replace those worn out by continued fighting in Ukraine.<sup>30</sup> These older weapons can potentially keep the frontline batteries operating for a long time, with the Russian defense industry once again relying on its massive Cold War-era stockpiles to maintain ongoing combat.

## Uncrewed Aerial Vehicles

One of the biggest developments in this war, especially in 2023, was the rapid emergence and scaling up of the so-called Russian loitering munitions kill chain—a compilation of UAVs with the ability to find and track targets, convey targeting data, and then assign a fire mission to the selected strike asset. To complete the kill chain, Russia has relied on short-range tactical FPV drones and commercial quadcopters, mid-range Lancet and Kub drones, long-range Geran-2 drones and their derivatives, such as the Italmas, as well as the Eleron-3, Eleron-7, Orlan-10, Orlan-30, Zala variants, and Supercam drones, to name a few. The quantity of different aerial drone types used in this war is unprecedented, especially as tens of thousands of tactical FPV-type UAVs are used every month. This scale of use, coupled with high Russian UAV losses due to Ukrainian countermeasures, therefore requires continuous drone manufacturing pipelines.

Indeed, there are indicators Russia is ramping up manufacturing for the entire drone lineup. For instance, the Kalashnikov Concern, a Rostec subsidiary manufacturing combat weapons, has converted a shopping center in the Russian city of Izhevsk into a drone manufacturing plant to make the Italmas drones.<sup>31</sup> The latter are new Russian UAVs—similar to, yet cheaper than, the Iranian-made Shahed drones—which have been increasingly used in recent months in Ukraine.<sup>32</sup> In May 2023, Kalashnikov’s president said the company would be able to increase the number of UAVs produced, including loitering munitions and reconnaissance drones, “by several times” in 2024.<sup>33</sup> While it is difficult to confirm exact production numbers, the Russian MOD has boasted about sending 22,000 drones to the battlefield in 2023.<sup>34</sup>

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Iranian-made UAVs or drones modeled after them have played an important role on the battlefield. According to a senior NATO official, each month Russia is producing between 300 to 350 one-way attack drones based on a model provided by Iran.<sup>35</sup> For instance, Russia has increased production of Geran-2 drones—a Russian name for the Iranian-made Shahed-136 loitering munitions that have played an important role in the war by striking Ukrainian stationary civilian and military targets such as energy infrastructure and key industrial facilities (a tactic that remains relatively unchanged since the fall of 2022, when the drones were first introduced). To increase the capacity of these UAVs, Russia has inaugurated a massive factory in Alabuga, east of Kazan, with an ambitious goal of manufacturing anywhere from 6,000 to 10,000 Geran-2 drones.<sup>36</sup> By the end of 2023, Russian forces had already fired an estimated 3,700 Geran-2 drones inside Ukraine, indicating a growing reliance on this weapon as a complement and surrogate to long-range missiles.<sup>37</sup>

Another Russian military go-to drone is the Lancet loitering munition lineup, with more than 1,000 recorded uses of this drone by February 2024 against Ukrainian high-value targets such as Western-provided long-range and precision artillery.<sup>38</sup> However, recently, Lancet production has proved vulnerable, with Ukraine likely targeting Russian defense enterprises that manufacture components for this UAV. For instance, there was a huge explosion at the Zagorsk Optical-Mechanical Plant (ZOMZ) in August, which may have been producing components for Lancet drones.<sup>39</sup>

Besides these attack drones, the Russian military continues to rely on commercial UAVs such as the Chinese-made DJI and Autel, which are popular systems for conducting ISR and precision-drop missions. Yet the most common and increasingly valuable drone across the Russian force is an FPV-type drone assembled almost entirely from Chinese-made commercial components. Such drones typically cost less than \$500 to assemble and can carry a variety of weapons and munitions at nearly 100 miles per hour to target. Since an operator can maneuver an FPV drone to strike any desired spot or location with precision, they have become increasingly dangerous to all vehicles and soldiers on the field, including even well-protected tanks.

Unlike most of the military drones mentioned, practically all FPV-type drones are assembled by the country's sprawling volunteer effort, which includes individuals, organizations, start-ups, and enterprises that fundraise for support among regular Russian citizens as well as wealthy individuals and regional governments.<sup>40</sup> In 2024, FPV drones, along with ISR UAVs providing overwatch, have become so effective that they affect how both forces are fighting, requiring changes to logistics, evacuation, maneuvering, transportation, and other requirements for troops and weapons.<sup>41</sup> The sheer quantity of Russian FPV drones is difficult to estimate. In late 2023, Ukrainian volunteers and military estimated that the number of Russian volunteer-built FPV drones and light quadcopters may total around 300,000 per month.<sup>42</sup> While this number may seem extremely high (especially in light of official Russian MOD data stating the Russian military received roughly 22,000 drones of all types via official MOD channels in 2023), some Russian volunteers boast their specific nationwide assembly efforts can build up to 100,000 FPVs per month, or even greater numbers when other efforts are included in the total.<sup>43</sup> Such numbers, even if exaggerated, imply a continuous and practically uninterrupted flow of Chinese components (discussed in detail in the following

section) to numerous Russian volunteer efforts and indicate that the Russian military will come to increasingly rely on FPV drones as cheap, expendable tactical weapons well into 2024 and beyond.

Indeed, realizing the battlefield impact of both commercial and military drones, the Kremlin will likely continue deploying these cost- and time-effective weapons throughout 2024. In January 2024, the Russian MOD pledged a significant uptick in drone production for the military encompassing practically all drone types, from short-range FPV-type and ISR drones to mid- and long-range reconnaissance and combat models.<sup>44</sup> It reportedly is even pushing ahead with introducing additional new drone designs.<sup>45</sup>

## Missiles

Despite the increasing significance of drones, the Russian military continued to rely on its tactical and long-range precision strike missiles to attack Ukrainian targets in 2023. By the end of last year, Russia had fired off an estimated 7,400 missiles into Ukraine since beginning its invasion.<sup>46</sup> The pace of missile use ebbed and flowed, however, and the Russian military often fired its missiles together with Geran-2 drones to aid in penetrating Ukrainian air defense and increase their lethality. In one such attack in December 2023, Russia launched more than 100 missiles and dozens of drones against Ukrainian civilian targets.<sup>47</sup>

According to Western officials, Russia limited its cruise missile strikes in the second half of 2023 in an effort to build up stockpiles for attacks in 2024.<sup>48</sup> The Russian MOD's use of Iskander-M, Kinzhal, Kh-22, Kh-47, Kh-101, and other missiles is also expected to increase in 2024 as the domestic defense industry ramps up missile production.<sup>49</sup> Estimates have varied regarding the exact number of missiles Russia is capable of producing. In May 2023, for instance, Ukrainian intelligence found that Russia manufactured around sixty cruise missiles, five Iskander ballistic missiles, and two Kinzhals per month. In June 2023, the Ukrainian government noted it continued to discover Western-made microelectronic components among the wrecks of Russian missiles that were likely sourced from partners like China.<sup>50</sup>

Assessments regarding Russia's domestic missile production capacity started to change in September 2023, when different Russian weapons manufacturers promised to ramp up missile production efforts. For instance, the JSC Tactical Missiles Corporation—a state-run defense company specializing in missile production—said in September 2023 it had doubled production of precision weapons and, in certain cases, had increased production by as much as 3.5-5 times.<sup>51</sup> In November 2023, a Ukrainian investigative team reported an expansion at the Dubna Machine-Building Plant, which is owned by JSC.<sup>52</sup> At around the same time, Kalashnikov also promised to more than double production of Vikhr anti-tank missiles and Kitolov laser-guided artillery shells by opening two new facilities to speed up this effort.<sup>53</sup> Due to these and other similar activities, some Western analysts have recently estimated that at the beginning of 2024 Russia may have increased its stockpile to 200 Iskander 9M723 ballistic and 9M727 cruise missiles, along with other missile variants.<sup>54</sup>

Going forward, Russia will likely launch these missiles together with Geran-2s, using the aerial drones to identify and target Ukrainian air defenses and then flying the missiles through or even





*The remains of a Kh-47M2 Kinzhal missile at an exhibition showing remains of missiles and drones that Russia used to attack Kyiv on May 12, 2023.*

Photo: Oleksii Samsonov/Global Images Ukraine via Getty Images

around corridors cleared of most active air defense. Such a combined salvo could be a game changer in this war given a growing stock of Geran drones relative to Russia's overall missile force use in Ukraine. Indeed, according to Ukrainian estimates, since the beginning of 2024, the Russian Armed Forces have already used almost 1,000 missiles and about 2,800 Geran drones against targets in Ukraine.<sup>55</sup>

## **Electronic Warfare Systems**

Electronic warfare (EW) systems remain the most active and capable countermeasures against most drones that permeate the Ukrainian battlefield. With thousands of UAVs in the air at any given time, both sides in this war have invested considerable resources into EW systems, concepts, and tactics. At this point in the war, the Russian military likely maintains an advantage over Ukraine when it comes to EW tactics, techniques, and procedures and has numerous EW systems fielded across the front, though this does not necessarily translate into more capacity to intercept Ukrainian aerial drones. In 2023 and beyond, the Russian defense industry continued to field a significant number of EW systems, ranging from large wheeled stationary complexes to portable systems transportable by light vehicles to individual soldier systems such as handheld counter unmanned aerial system (CUAS) rifles.

Sample Russian EW systems include the Serp stationary complex, designed to counter different UAV types, as well as Sania and ORK, specifically designed to counter the kind of FPV-type drones Ukrainians have deployed against their Russian opponents.<sup>56</sup> Other commonly used systems include

Lesochek, designed to counter FPV drones and light quadcopters, which can be mounted on vehicles and tanks.<sup>57</sup> In 2023, there was a notable shift away from the very large systems present in 2022—such as Krasukha—which emit a lot of electromagnetic radiation and, in turn, can be attacked by Ukrainian missiles, high-precision artillery, or even drones, toward smaller portable systems such as Antidrone and Pole-21, which can be quickly assembled and fielded close to the front lines.<sup>58</sup> Russian volunteers can purchase other EW devices, such as light Chinese-made CUAS rifles, from commercial manufacturers and deliver them directly to the front.<sup>59</sup> Western analysts note that Russian EW systems require high-tech components that have commercial origins, such as amplifiers, synthesizers, and software, indicating the Russian defense industry’s continued reliance on imports and international partners to acquire such technologies.<sup>60</sup> Various EW systems and tactics will take center stage for the Russian military in 2024, along with the large-scale use of drones and artillery to hold off Ukrainian attempts to break out of the current stalemate.

# Part II

## *Russia's Evolving Import Diversification Efforts*

As demonstrated in the previous section, Moscow has more actively pivoted to lower-cost weapons, such as less advanced tanks, armored vehicles, artillery, and expendable UAV types, which continue to be effective on the battlefield. By contrast, more high-tech weapons, such as advanced combat aircraft and helicopters and long-range missiles, are less frequently used during combat. Therefore, in terms of the key components and electronics the Kremlin needs for its war machine, it has moved away from tailored high-end military components toward dual-use or even purely civilian technologies. As a consequence, the composition of Russia's suppliers has also changed as more military goods flowing into Russia are sourced from civilian or dual-use suppliers. Accordingly, in 2023, fewer Russian military companies were being sanctioned, and more companies that have a principally civilian footprint but are supplying Russia's war effort have now found themselves on sanctions lists. These shifts in military supply chains have become a key challenge for sanctions investigators and are explored in greater detail below.

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*[Russia] has moved away from tailored high-end military components toward dual-use or even purely civilian technologies. As a consequence, the composition of Russia's suppliers has also changed as more military goods flowing into Russia are sourced from civilian or dual-use suppliers.*

## Methodology

CSIS experts tracked and analyzed the international procurement and distribution networks Russia has relied on to gain critical components—also referred to as key military goods for the purposes of this research—needed for its war effort. This analysis proceeded in three main steps: (1) determining the list of key military goods critical for Russia’s defense industry, (2) identifying main trends in the supply of these goods into Russia, and (3) examining individual companies and actors involved in their supply to Russian actors.<sup>ii</sup>

Initially, the research team identified the goods most in demand within Russian military industrial production circles throughout the last year of the war. To do so, the team relied on the list of high-priority items issued jointly by the sanctions and export control enforcement authorities of the United States, United Kingdom, European Union, and Japan.<sup>61</sup> This list, divided into four tiers, consists of items designated by their harmonized system (HS) codes at the six-digit level that pose a heightened risk of illegal diversion to Russia due to their criticality to its war machine.<sup>iii</sup> Tier 1 includes specific electronic integrated circuits, which play a key role in the production of advanced Russian precision-guided weapons systems. Russia currently lacks capacity to manufacture these items domestically, and the number of global manufacturers making these goods is also limited. Tier 2 includes certain electronic items, such as switching and routing apparatus and radio navigational aid apparatus, for which Moscow may have some domestic production capability, but it prefers to source them from Western countries, including the United States. Tiers 3 and 4 consist of items such as ball bearings and computer numerical controlled (CNC) machine tools and components that are critical to Russia’s war effort but may be acquired from a broader range of global suppliers.<sup>62</sup>

This list was then supplemented with additional goods gleaned from open-source reporting on Russia’s sanctions evasion efforts. Those were identified based on their prevalence in open-source reporting channels, including Telegram and other social media channels, and then mapped to corresponding HS codes at the level of six digits. This allowed the research team to identify additional import and export patterns for key goods, such as fiberglass, brushless motors, and quadcopter blades.

The team then supplemented the above two goods categories with additional HS codes derived from the historical trade practices of sanctioned Russian companies. Two years into the war, international sanctions enforcement bodies have publicly designated a significant number of companies and individuals for their involvement in Russia’s military procurement efforts. CSIS, in consultation with trade and supply chain data experts, analyzed the historical procurement activities of these firms, assembling lists of key HS codes procured by these companies since the beginning of the full-scale invasion. As a result, the research team created a consistent, representative sample of key military

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ii Throughout all three research steps, the research team at CSIS engaged in discussions with supply chain and trade experts regarding international trade data provided to CSIS by those experts.

iii Goods are assigned HS codes in order to facilitate the determination of import/export duties, handling procedures, and classification schema in the normal course of international trade. HS codes are standardized globally. Codes increase in specificity from overall chapters of two digits down to specific goods at the eight- and ten-digit levels. However, international standardization prevails only up to the six-digit level. CSIS has therefore only examined HS codes at the six-digit level of specificity.

goods necessary to the continued functioning of Russia’s military industrial complex. In total, the team identified 409 distinct HS codes at the level of six digits—all corresponding to items frequently bought or sought by Russia’s military industrial companies.

Next, the CSIS research team, following conversations with trade data analysts, identified key aggregate trends in the supply of goods from the sample into Russia as well as the Russia-led Eurasian Economic Union between January 2022 and July 2023 to capture both direct imports and shipments at risk of diversion.<sup>iv</sup> The research team analyzed major temporal trends as well as important shifts in the composition of the country of origin by good over time.

Finally, CSIS identified individual companies and actors involved in the supply of key military goods to Russian actors. In particular, the research team focused on one China-based organization that supplies drone motors and other components to multiple Russian companies, including companies that have previously been sanctioned for military procurement. Importantly, these same companies at times also supply Ukrainian actors with critical drone parts, pointing to complicated trade-offs in sanctions policy.

## General Trends

Overall, global supply chain data analyzed by CSIS shows that Russia has been continuously adapting its purchasing patterns, which enabled it to bypass sanctions and acquire components for its defense industrial base. Since the beginning of the invasion, electrical machinery and equipment, including microelectronics, have comprised around one-third of the total imports of key military goods, reflecting the importance of electronics for Russia’s new brand of warfare (see Figure 1). The volume of key military goods imports increased sharply in the months following the declaration of partial military mobilization in September 2022, surpassing 500,000 total transactions since the beginning of 2023 (see Figure 2).<sup>v</sup>

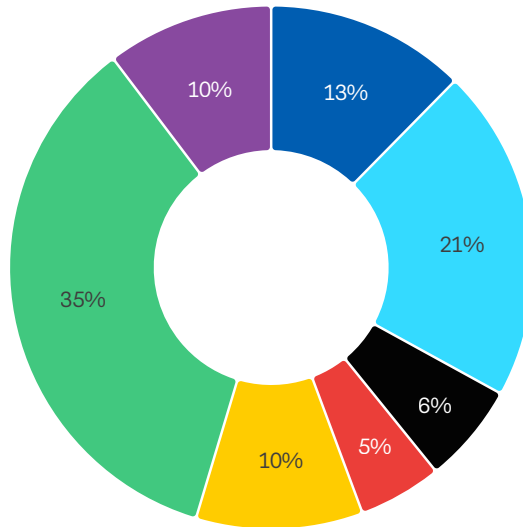
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<sup>iv</sup> The sample ends in July 2023, as this was the period during which the research team was able to compile the most accurate and up-to-date information related to Russian import patterns for the given time period.

<sup>v</sup> The true volume of goods imported is likely larger than 500,000, as a single import transaction record may include the import of multiple units of a given good.

**Figure 1: Breakdown of Russian Imports of Key Military Goods by HS Chapter**

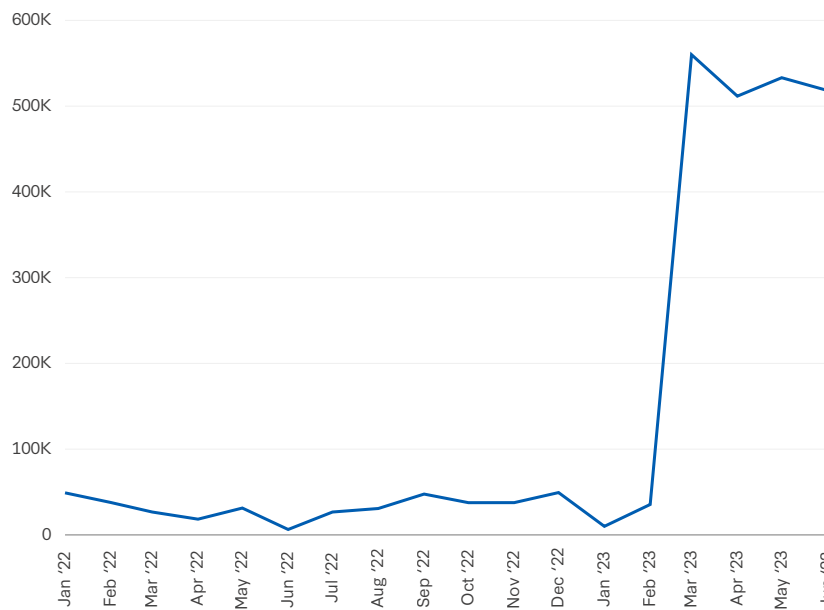
● Other ● HS40 ● HS84 ● HS73 ● HS85 ● HS87 ● HS39



Note: The following items are included in the above HS chapters: HS40 (rubber and articles thereof); HS84 (nuclear reactors, boilers, machinery, and mechanical appliances; and parts thereof); HS73 (articles of iron or steel); HS85 (electrical machinery and equipment and parts thereof); HS87 (vehicles other than railway or tramway rolling stock, and parts and accessories thereof); HS39 (plastics and articles thereof). HS Chapter 85 (electrical machinery and parts thereof, such as semiconductors, CNC machines, and other military goods) predominates, with microelectronics-related subchapters comprising the bulk of import activity. HS Chapter 84 (nuclear reactors, boilers, machinery, and mechanical appliances) falls in a distant second place.

Source: Authors' research and analysis.

**Figure 2: Volume of Russian Imports of Key Military Goods**

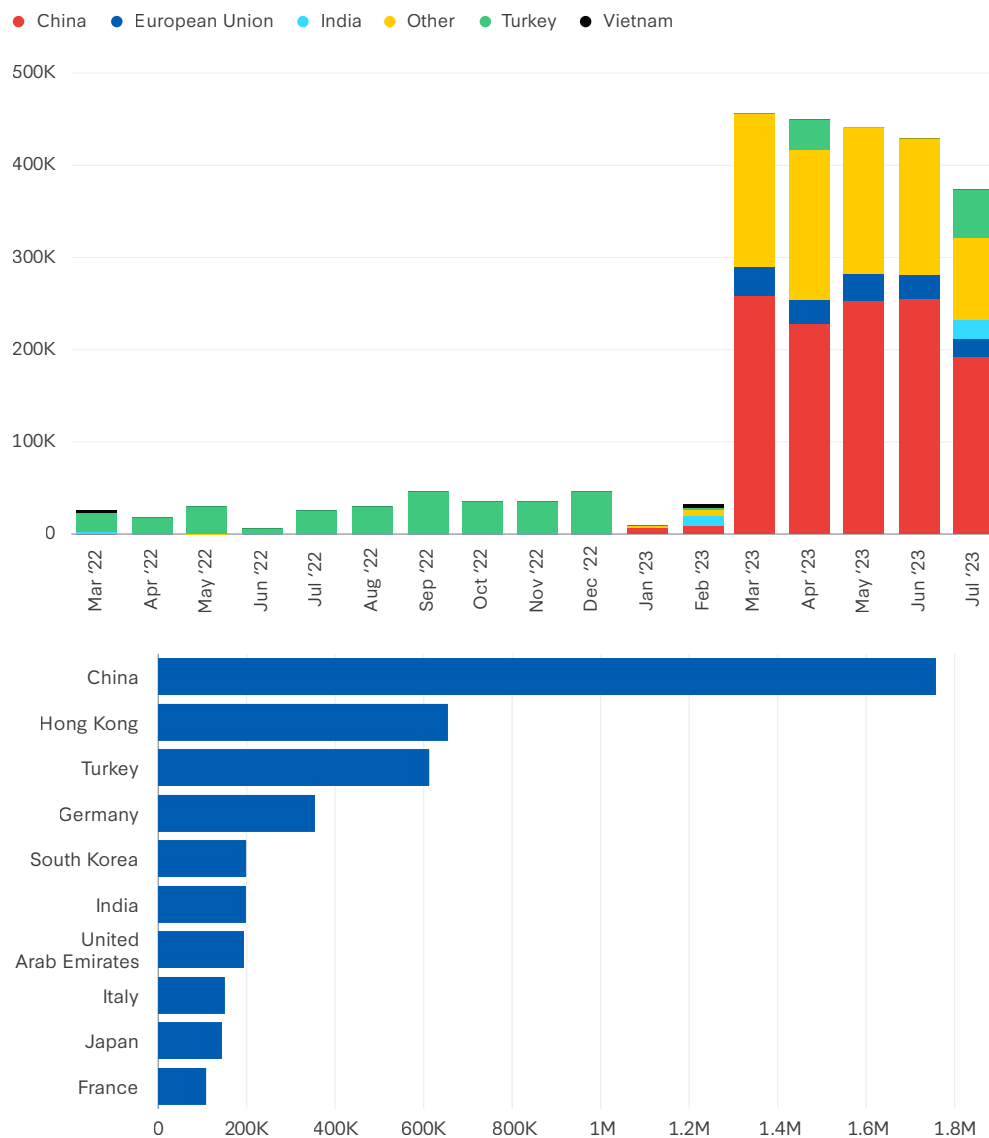


Note: The figures on the y-axis represent transaction records.

Source: Authors' research and analysis.

Indeed, throughout the war, and especially in 2023, Russia has doubled down on its import diversification efforts for key military goods, further pivoting away from the West and developing both official and unofficial channels of communication with “friendly nations” across the Asia Pacific and Middle East. According to General Valery Gerasimov, the chief of the General Staff of the Russian Armed Forces, “The Russian Defense Ministry continued boosting rates of interaction with foreign military agencies within military and military-technical cooperation, with more than 600 major events implemented” in 2023.<sup>63</sup> The CSIS analysis (see Figure 3) also confirms a significant shift has occurred in the composition of Russia’s trading partners for key military goods, with direct prewar Western suppliers mostly being replaced by Chinese suppliers as well as shell companies located in Hong Kong, Turkey, India, and Vietnam, among others.

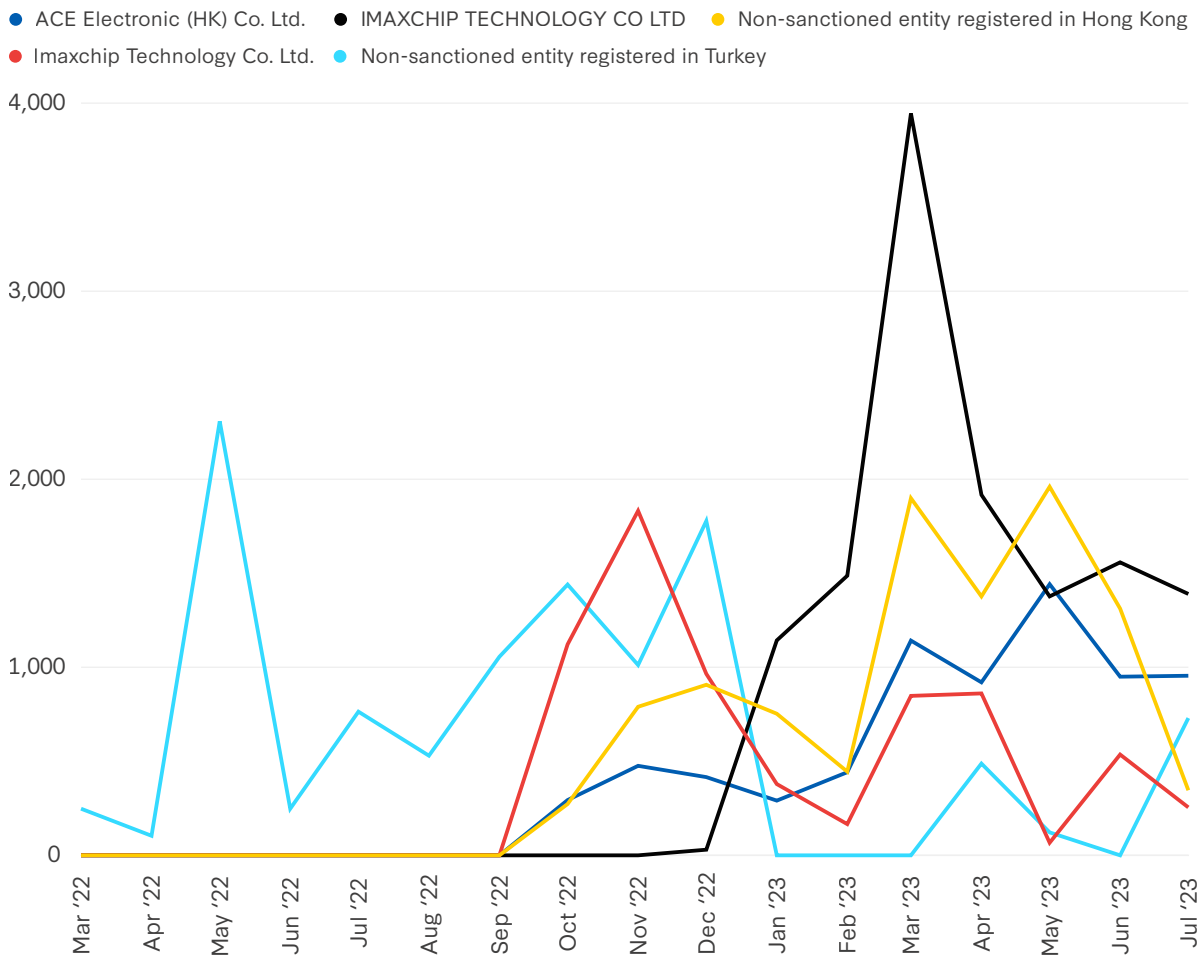
**Figure 3: Russian Imports of Key Military Goods by Country of Origin**



Note: Figures represent transaction records. Since the beginning of the war, suppliers located in China and Hong Kong, as well as Turkey, have dominated imports of key military goods to Russia.  
Source: Authors’ research and analysis.

Similarly, the distribution of the companies both supplying and procuring key military goods has seen a significant shift since the beginning of the war and the ongoing campaign of sanctions imposed by the West. Figure 4 shows the import trends associated with the top five suppliers of microelectronics into Russia since March 2022, irrespective of country of origin or sanctioned status. Interestingly, nearly all of the top exporters of microelectronics are based in China and Hong Kong, with one entity based in Turkey. Data obtained by CSIS further show many of the most significant importers of electronic goods have emerged since the declaration of partial military mobilization in September 2022, indicating the principal importers of important electronics into Russia are not themselves long-standing firms but likely shell companies.

**Figure 4: Russia’s Top Five Microelectronic Supplier Companies**



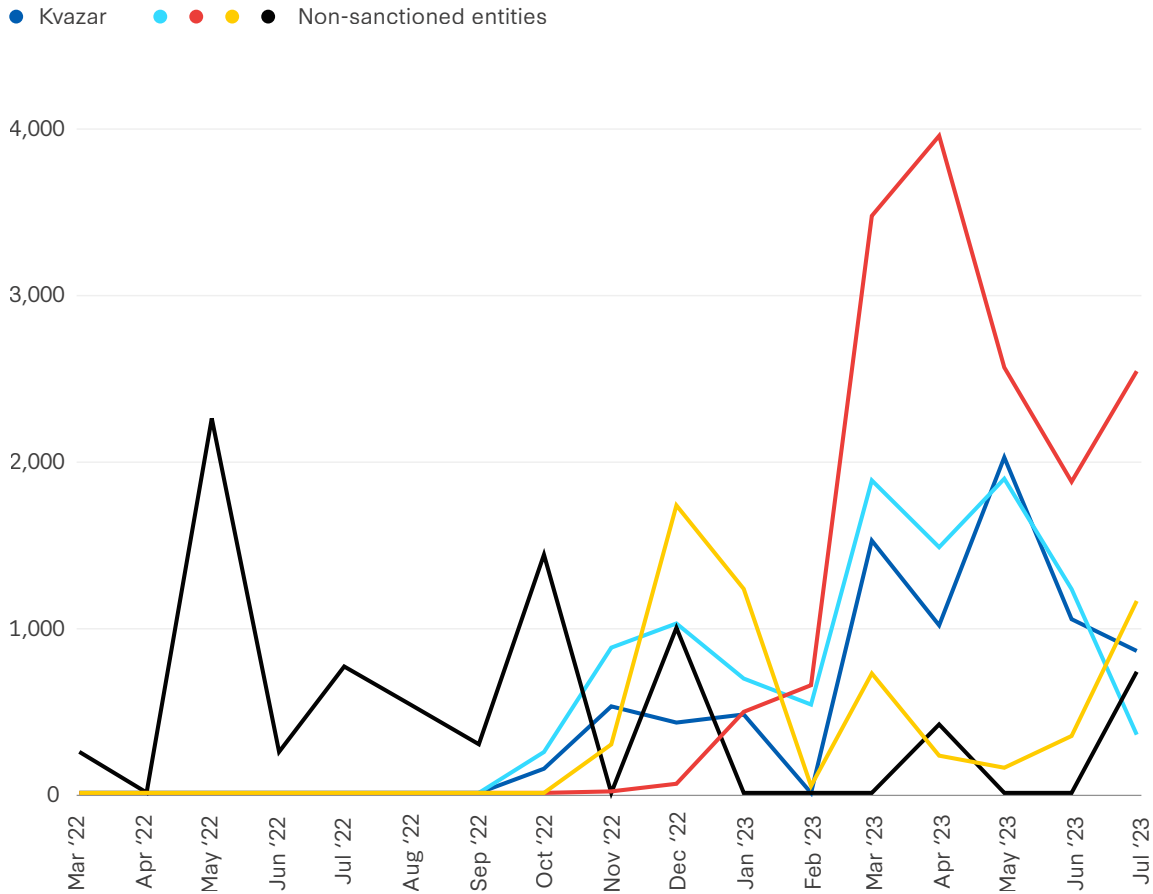
Note: The figures on the y-axis represent transaction records. IMAXCHIP TECHNOLOGY CO LTD and Imaxchip Technology Co. Ltd. showed up as distinct entities in the trade data obtained by CSIS. Therefore, the research team decided to list them as distinct entities in Figure 4.

Source: Authors’ research and analysis.

Likewise, there was significant change in the breakdown of Russian importers of electronic goods in the period studied (see Figure 5), with small procurement vehicles showing up as some of the most prominent importers of microelectronics into Russia since March 2022.



**Figure 5: Top Five Russian Importers of Microelectronics into Russia**



Note: Figures on the y-axis represent transaction records.  
 Source: Authors' research and analysis.

Building on the general trends highlighted in the trade data analysis, the research team looked deeper into the key countries that directly and indirectly supported Moscow's war effort throughout 2023, including China, Turkey, North Korea, and Iran, among others. Taken together, these countries have shipped not only military weapons and sanctioned dual-use goods, but also civilian and commercial technologies into Russia, including construction equipment, which have helped Russia put up a resilient defense against Ukraine's 2023 counteroffensive. Finally, in the case of China, CSIS analyzed Beijing's trade patterns with Moscow to illuminate China's role as the most important country enabling Russia's war effort.

***Many of the most significant importers of electronic goods have emerged since the declaration of partial military mobilization in September 2022, indicating the principal importers of important electronics into Russia are not themselves long-standing firms but likely shell companies.***

## China

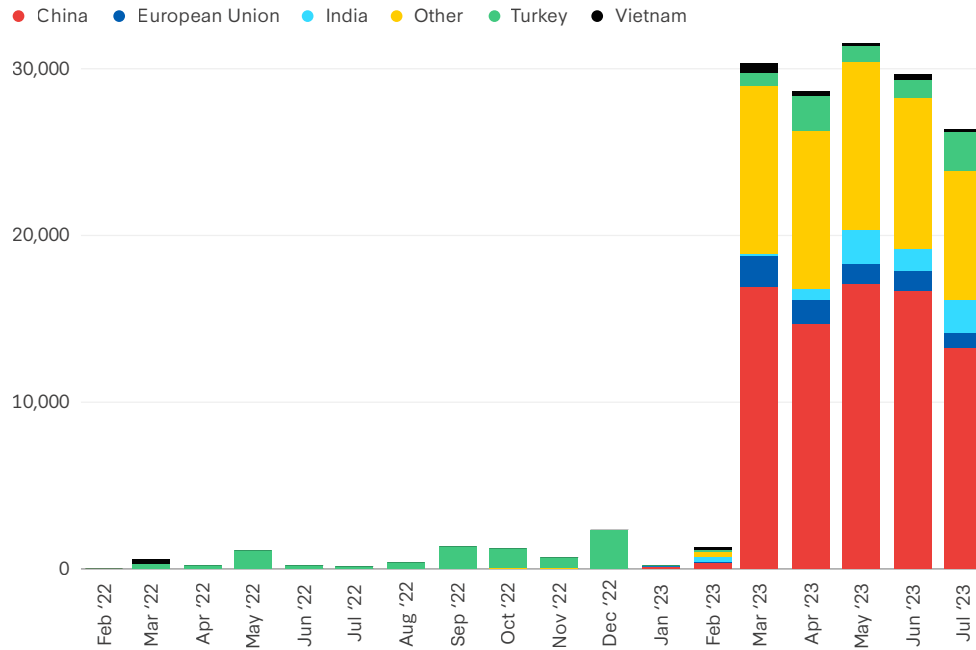
China has been Russia's key defense partner throughout this period, providing direct and indirect support to Moscow's military machine. By 2023—despite the threat of Western secondary sanctions—Chinese supplies to Russia fully replaced imports from Europe, the United States, South Korea, and Taiwan, as trade between the two countries hit a record high of \$240 billion, growing 26.3 percent from 2022. Chinese shipments to Russia jumped 46.9 percent from 2022 to 2023 and 64.2 percent from 2021 to 2023.<sup>64</sup> Having surpassed the European Union and become Russia's largest trade partner, China now exports to Russia a significant share of dual-use items and technologies, from much-needed electronics to drones.<sup>65</sup>

More precisely, throughout the war, China has sold millions of dollars' worth of semiconductors, chips, ball bearings, navigation equipment, parts for fighter jets, and other components to Russia.<sup>66</sup> This has ultimately enabled the Kremlin to speed up its weapons production, including armor, artillery, missiles, and drones, and put up an effective defense against Ukraine's 2023 counteroffensive. For instance, according to some estimates, Beijing's overall share in Russian imports of machine tool parts jumped to 32 percent in 2022 and to 80-90 percent in 2023, while Chinese imports of metalworking machine tools to Russia grew to nearly 60 percent in 2022 and about 90 percent in 2023.<sup>67</sup> In November 2023, Chinese year-to-date total exports of ball bearings to Russia were also up 345 percent from the same period in 2021, while exports to Kyrgyzstan, also likely subsequently routed to Russia, were up around 2,500 percent.<sup>68</sup>

An investigation by CSIS captured noteworthy shifts in Sino-Russian trade patterns surrounding a meeting between Chinese president Xi Jinping and President Putin in March 2023 (see Figure 6). For instance, narrowing in on imports of the Tier 3 high-priority items (specific electronic and mechanical components used in Russian weapons systems), as defined by multinational sanctions authorities, Beijing's importance as a supplier of these goods comes through strongly.<sup>69</sup> There was a sudden influx in shipments of high-priority items from China to Russia in March 2023, when President Xi visited Russia.

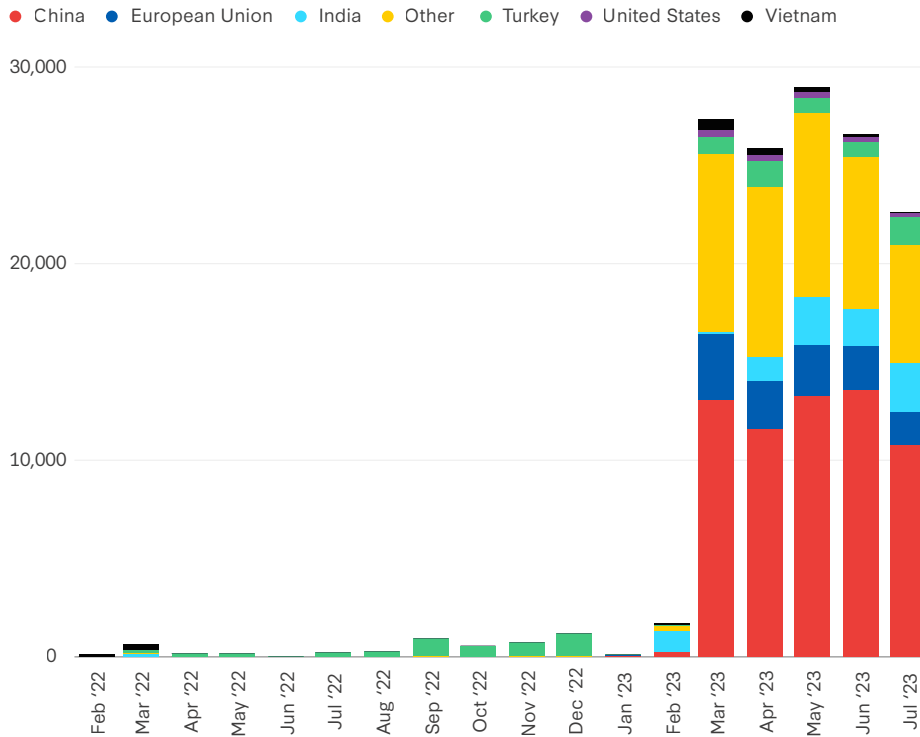
In addition to the Tier 3 high-priority items, Russian imports of CNC machines (Tier 4)—which are used to provide precise parts for various weapons systems from ammunition to aircraft—from Chinese companies also experienced a sharp increase in the months following the Xi-Putin March 2023 meeting.

**Figure 6: Russian Imports of Tier 3 High-Priority Items by Sender Country of Registration**



Note: The figures on the y-axis represent transaction records.  
Source: Authors' research and analysis.

**Figure 7: Russian Imports of CNC Machines by Sender Country of Registration**



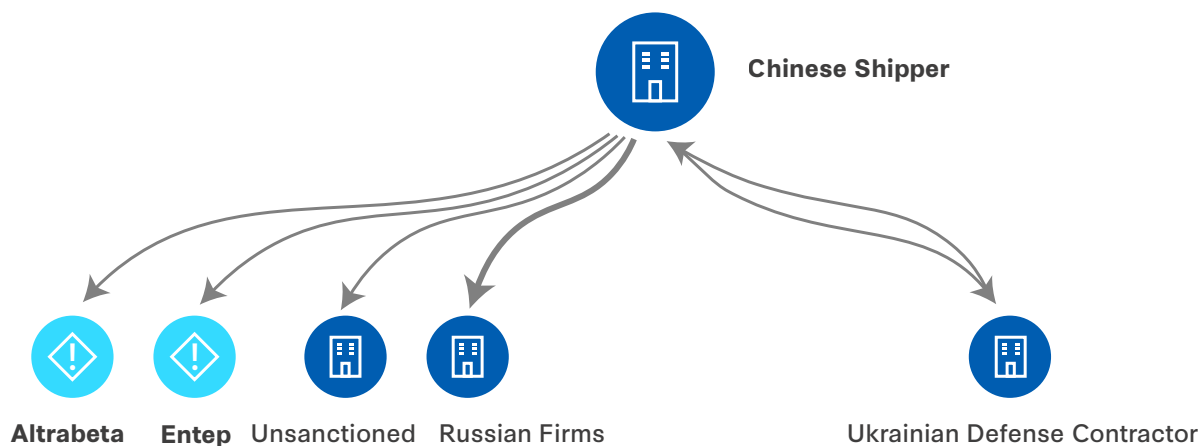
Note: The figures on the y-axis represent transaction records.  
Source: Authors' research and analysis.

While examining these aggregate trends is useful for understanding general war-related Sino-Russian trade patterns, it is ultimately individual companies that furnish components for Russia's war machine that are the targets of U.S. and allied sanctions efforts. CSIS has looked deeper into Russian imports of drone parts from Chinese companies due to the increasing significance of UAVs in Ukraine, as highlighted in the previous section. In April 2022, China's biggest drone manufacturer, DJI, which has a more than 90 percent share of the global consumer drone market, announced it would discontinue its businesses in Russia and Ukraine, shutting its flagship stores and halting most direct sales to those countries. However, according to public reporting, while Ukraine faced some issues acquiring DJI-made drones due to the ongoing sales ban, these products and relevant components were imported to Russia in substantial numbers between 2022 and early 2024 through complicated networks of intermediaries. Within the first six months of 2023, Russia received at least \$14.5 million in direct drone shipments from Chinese trading companies, while Ukraine received only around \$200,000 worth of shipments. Even though Ukraine still managed to obtain millions of dollars' worth of Chinese-made drones and components, most came from European intermediaries.<sup>70</sup>

Illustrating this point, the research team identified a network of foreign firms that have supplied sanctioned Russian actors, including Entep and Altrabeta (see Figure 8), with drone components throughout 2022 and 2023. Principally based in China and Hong Kong, with strong intermediary activity in Turkey, these firms have shipped goods including batteries, propellers, and motors—all explicitly designated for the production of quadcopters and multicopters—to Altrabeta and Entep in Russia as late as July 2023. Nearly identical shipments have also been made to companies in Russia that have not yet been placed on sanctions lists. In addition to direct supplies into Russia, these firms have supplied companies in intermediary jurisdictions, such as Turkey, which have then made exports of similar products into Russia.

But while these companies are likely suppliers of drone components to companies affiliated with Russia's military industrial sector, Russian firms are not their only clients. Some of the same Chinese and Hong Kong companies that trade with Russia's military suppliers also supply Ukrainian firms that supply the Ukrainian military. This points to a potential dilemma in the current Western sanctions strategy: while it is possible to sanction firms based on their connections to Russia's defense industry and war effort, doing so could endanger ongoing Ukrainian procurement, perhaps in ways that are not at first obvious without full multitiered supply chain visibility.

Figure 8: Visualization of Trade Networks of Sanctioned Russia-based Firms Altrabeta and Entep



Source: Authors' research and analysis.

In addition to components and technologies with overt military applications, the Kremlin has increased imports of goods that are not usually restricted by the international sanctions regime but nonetheless play an important role in Beijing's contribution to Moscow's war effort. For instance, Russia has significantly increased imports of Chinese-made trucks and digging and dirt-moving equipment, helping Russian troops entrench into and transport through occupied Ukrainian territories.<sup>71</sup> Chinese shipments of Aramid fiber to Russia—a class of heat-resistant synthetic fibers used in bulletproof vests—also rose more than 350 percent between 2021 and 2022, while in January and February 2023 alone, imports of this material had already reached half of 2022's full-year total.<sup>72</sup>

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***Some of the same Chinese and Hong Kong companies that trade with Russia's military suppliers also supply Ukrainian firms that supply the Ukrainian military. This points to a potential dilemma in the current sanctions strategy.***

Recently, Putin has stressed that Moscow and Beijing should seek greater cooperation in the high-tech sector, from joint production of higher-end microchips in the Russian Federation to construction of high-orbit assets for space.<sup>73</sup> Overall, as the Kremlin continued to pivot its defense industrial base away from the West throughout 2023, the role of China as an important defense and security partner increased dramatically. Beijing has helped ease pressure on Russia's defense industrial sector by providing vital equipment and technologies to help Russian forces wage a long war of attrition against Ukraine.

## Turkey

Turkey's position on Russia's invasion of Ukraine has been equivocal. On the one hand, Ankara has provided diplomatic support to Kyiv, refusing to accept Moscow's illegal seizure of Ukrainian territories and playing an important role in securing Ukraine's seaborne exports, including through a grain deal brokered jointly with the United Nations in July 2022. On the other hand, Ankara has never joined the Western sanctions regime. Instead, it has become one of the top buyers of Russian crude oil and one of Russia's key suppliers of the restricted dual-use goods required to build cruise missiles, drones, and helicopters.<sup>74</sup>

According to the *Financial Times*, in the first nine months of 2023, Ankara reported \$158 million in exports of 45 goods designated high priority by the allied sanctions enforcement agencies to Russia and five former Soviet countries—Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, and Uzbekistan. This number was three times the level recorded over the same period in 2022. Interestingly, while Turkey has officially recorded a surge in declarations of exports of high-priority items to the five ex-Soviet states, statistical agencies in these countries have not documented a matching rise in imports. Some analysts have suggested that the trade data discrepancies can indicate that those items reported by Ankara as destined for the intermediary countries were instead shipped directly to Russia. For instance, while Kazakhstan recorded \$6.1 million of imports of high-priority goods from Turkey between January and September 2023, Turkey's data showed that exports of those items to Kazakhstan reached \$66 million over the same period.<sup>75</sup>

However, more recently, Turkish-Russian trade seems to have been affected by the executive order signed by U.S. president Joe Biden in late December 2023 threatening financial institutions doing business on behalf of those targeted by U.S. sanctions with the risk of losing access to the U.S. financial system. According to a Reuters exclusive, initial data following issuance of the order showed Turkish exports to Russia decreasing by 39 percent year on year to \$631 million in January 2024 and imports from Russia declining by 20 percent to \$4 billion.<sup>76</sup> This has reportedly affected Ankara's role as a supplier of dual-use goods to Moscow as "exports of machinery, in particular, stopped simply because of the similarity with military equipment," according to a Reuters source familiar with this matter. In February 2024, the Biden administration announced new trade restrictions on 93 entities, including 16 from Turkey (the second-highest total after Russia), which may act as an additional deterrent for other Turkey-based companies helping Russia circumvent sanctions.<sup>77</sup> Yet considering Russia's adaptability to the sanctions regime, it remains to be seen if this impact will be long lasting.

## North Korea

Defense cooperation between Russia and North Korea reached a new level in 2023. In September, North Korean leader Kim Jong Un visited President Putin, triggering global concerns about deepening military cooperation between these two countries already in opposition to the West. During the trip, Kim and Putin visited the production sites for military aircraft at Komsomolsk-on-Amur and the Russian Pacific Fleet at Vladivostok, as well as the Vostochny Cosmodrome, a Russian spaceport. Shortly after the visit, CSIS reported increased activity at North Korea's Tumangang rail facility bordering Russia, suggesting the dramatic increase in rail traffic could indicate North Korea

was supplying Russia with arms and munitions as part of military-technical cooperation agreements the two leaders might have signed back in September.<sup>78</sup>



*Vladimir Putin and Kim Jong Un visit the Vostochny Cosmodrome in Amur region, September 13, 2023.*

Photo: Mikhail Metzel/AFP via Getty Images

In the months that followed, different countries accused North Korea of selling weapons to Russia, including the United States and South Korea. In October, the White House announced Pyongyang had delivered more than 1,000 containers of defense equipment and munitions to Moscow to support its war effort.<sup>79</sup> Shortly after, South Korea’s National Intelligence Service (NIS) claimed North Korea had sent over one million artillery shells to Russia by sea, which were then conveyed by train to Ukraine. NIS estimated those deliveries would keep Russian troops supplied for two months.<sup>80</sup> In January 2024, South Korean defense experts said North Korea might have provided as many as 5,000 containers of weapons to Russia as of the end of December 2023, potentially holding around 2.3 million rounds of 152 mm shells, or around 400,000 rounds of 122 mm artillery shells.<sup>81</sup> At the same time, Washington revealed new information suggesting that Russia in its recent strikes against Ukraine had used short-range ballistic missiles sourced from North Korea. U.S. national security spokesperson John Kirby called Pyongyang’s arms transfer to Moscow a “significant and concerning escalation” and said the United States would introduce additional sanctions against those involved in such arms deals. A South Korean envoy stated Ukraine has become a test site for North Korea’s nuclear-capable missiles.<sup>82</sup> A recent CSIS report also found that since August 2023 there have been at least 25 different visits by vessels to North Korea’s port of Najin, to load munitions destined for Russia. Additionally, at least 19 “dark vessels”—vessels that have their automatic identification system (AIS) transmissions turned off to avoid outside detection—have visited Russia’s Vostochny Port to both unload and load containers.<sup>83</sup>

It is believed Kim expects that, in exchange for North Korean munitions, the Russian defense ministry will provide advanced technologies and know-how to boost North Korea's military, nuclear, and space programs. In fact, Moscow may have already helped Pyongyang successfully launch its military reconnaissance satellite in late November 2023—two months after the Kim-Putin summit in Russia. This success followed two failed attempts in May and August of the same year. According to CSIS analysis, there is “a strong causal connection between Russian support and the pre-summit and post-summit launch results.”<sup>84</sup> Putin has also suggested Russia would help North Korea develop its space satellite program, while sources close to the Russian defense ministry have said the ministry is looking for ways to deepen collaboration with Pyongyang, including organizing joint scientific conferences.<sup>85</sup> Should North Korea develop fully functional military satellite capability with Russian assistance, it would be able to acquire real-time information about U.S. and South Korean military activities on the peninsula.<sup>86</sup>

Overall, 2023 saw a strengthened defense industrial partnership between Russia and North Korea, which has not only benefited the Russian military but also violated the UN Security Council's sanctions resolutions on Pyongyang and undermined Western nonproliferation efforts.<sup>87</sup> As long as the war of attrition continues, the Kremlin will likely seek to continue importing North Korean munitions, in return sharing sensitive defense technology and know-how with Kim's regime.

## Iran

Iran has been playing an important role in supplying Russia with combat drones. According to Kyiv, Moscow has launched at least 3,700 Iranian-made Shahed attack drones targeting Ukraine's military and energy infrastructure as well as its major cities and civilian neighborhoods since September 2022. While Kyiv has been successful at shooting down up to 80 percent of those drones, such continuous mass attacks have been overwhelming Ukraine's air defenses and have intensified in recent months, with around 10-15 Ukrainian regions engaged in shooting down Shaheds every night.<sup>88</sup> While Iran has admitted selling Moscow drones before the war started, it has denied supplying Russia with military aid for the war in Ukraine.<sup>89</sup>

Existing evidence indicates the contrary. Throughout 2023, multiple reports covered Russia and Iran's plans to construct a new factory in Russia's Tatarstan region that could build at least 6,000 Iranian-designed Shahed drones (also known as Geran-2s in Russia) by 2025.<sup>90</sup> In February 2024, evidence emerged of plans to build as many as 10,000 Shahed-type drones in Russia, indicating Moscow's increasing demand for this UAV as one of its go-to weapons against Ukraine.<sup>91</sup> Production of Shaheds in this factory would reportedly include improving Iranian fabrication processes and ultimately advancing the drone's capabilities. Satellite imagery from November showed progress in plant construction, including new structures and security perimeters with checkpoints. Images also suggested that the buildings where the drones are being made were already operational.<sup>92</sup> While the current production rate at this plant remains unknown, recent estimates have suggested that Russia produces up to 350 Shahed drones monthly.<sup>93</sup>

In addition to Russo-Iranian cooperation on drones, Iran has sent Russia at least 400 short-range Fateh-110 ballistic missiles since January 2024.<sup>94</sup> According to defense experts, these road-mobile



missiles are accurate and reliable systems, capable of striking targets at a distance of 300–700 kilometers (186–435 miles), and Russia could successfully use them on the battlefield in Ukraine.<sup>95</sup> Additional shipments from Iran might be on their way: according to 2022 U.S. Central Command estimates, Iran had over 3,000 ballistic missiles in its arsenal.<sup>96</sup> Yet, based on Estonian intelligence assessments, while delivering Iranian ballistic missiles to Russia would mark an advancement in Russo-Iranian relations, it probably will not offer Russia a significant breakthrough in Ukraine, as Iran has insufficient capabilities to supply Russia with large quantities of missiles over an extended period.<sup>97</sup> In return for the missiles, the Kremlin has allegedly offered unprecedented defense cooperation to Tehran, including selling attack helicopters, radar systems, and combat trainer aircraft in addition to the advanced Su-35 fighter jets Iran has publicly declared it wishes to purchase from Russia.<sup>98</sup>

Russia's and Iran's decisions to move away from the Society for Worldwide Interbank Financial Telecommunications (SWIFT) payment system for cross-border transactions by the end of 2023 might further encourage arms sales between the two countries. According to the deputy head of the Central Bank of Iran, Tehran and Moscow will set up a direct interbank transfer mechanism allowing companies in both countries to trade in their respective national currencies (rials and rubles) instead of dollars or euros. A currency agreement between the two parties is expected to be signed in 2024.<sup>99</sup> Should the agreement come into effect, it could ease, as well as encourage, larger-scale Russo-Iranian arms transfers, thus aiding Russia's war in Ukraine and logistically strengthening defense-military cooperation between the two countries.

## Other Noteworthy Actors

### UNITED ARAB EMIRATES

Similar to Turkey, the United Arab Emirates (UAE)—traditionally a Western ally but also a member of the Organization of the Petroleum Exporting Countries Plus (OPEC+) oil alliance, together with Russia—has refused to take sides or join the Western sanctions regime against Russia. Thanks to this approach, it has attracted Russian money and businesses fleeing increasingly hostile jurisdictions in other parts of the world. In addition to becoming a hub for the Russian business community, the UAE has seen a surge in imports of dual-use goods from Europe and the United States, many of which have found their way into Russian weapons and systems used in Ukraine.<sup>100</sup>

In November 2023, against the backdrop of multiplying Western concerns regarding the UAE's role as a gateway for Moscow to circumvent sanctions, it agreed to restrict the re-export to Russia of sensitive goods with military applications in Ukraine. Reportedly, the UAE would expand its import and export control list by including the items designated as high priority by the allied sanctions enforcement agencies.<sup>101</sup> Four companies from the UAE have also recently become subject to U.S. sanctions due to their association with Russia's war machine.<sup>102</sup> Overall, while the UAE has undoubtedly benefited from the position it has adopted vis-à-vis the Russia-Ukraine war, attracting ostracized Russian billionaires, it also values its economic and security relationship with the West and thus could become more willing to respect the Western export control measures.

## **INDIA**

The most notable aspect of the Russo-Indian relationship after the full-scale invasion has been New Delhi's purchase of discounted Russian crude oil.<sup>103</sup> But India has also supplied Russia with engineering items, including auto parts and electrical equipment and machinery with direct or indirect military applications. According to Reuters, India's exports of these goods to Russia increased by 88 percent between 2022 and 2023, while for the April-December period exports increased by 130 percent, standing at \$1.03 billion.<sup>104</sup> Furthermore, it has also been argued that Moscow might be buying back military supplies it had previously sold to New Delhi, including parts for night vision to enhance performance of Russian missiles at night and in low light.<sup>105</sup> However, given growing risks of secondary sanctions associated with the executive order signed by President Biden in late December 2023, such aspects of Russo-Indian trade might be curtailed in 2024.

## **KAZAKHSTAN AND UZBEKISTAN**

Officially, Kazakhstan and Uzbekistan remain neutral in the Russia-Ukraine war. At the same time, both countries have supported the sanctions decisions of Washington and Brussels on cooperation with Russian companies involved in the war against Ukraine. Still, according to the Organized Crime and Corruption Reporting Project, Kazakhstan and Uzbekistan have been playing an important role in supplying Russian companies with cotton pulp, which is used in the production of gunpowder and other propellants. Within the past decade, these countries have supplied over 98 percent of Russia's imported cotton pulp, with the trade growing since Russia's invasion of Ukraine.<sup>106</sup> Since May 19, 2023, the cotton pulp under HS code 470610 has been included in the U.S. export controls list, and since June 24, 2023, in the relevant EU list.<sup>107</sup> In view of this, the Western sanctions authorities may tighten export and re-export controls for these types of goods. The introduction of new trade restrictions on producers of raw materials from Kazakhstan and Uzbekistan may become an additional deterrent to other companies that help Russia circumvent sanctions.

# Part III

## *Existing Russian Military Industrial Vulnerabilities*

This section provides an overview of Russia's key remaining defense industrial weaknesses and explains their potential impact on the Kremlin's war effort going forward.

### **Reconstitution Rate**

Despite its capacity to manufacture weapons systems for an ongoing war, Russia is severely depleting its reserve stockpiles to sustain its war effort. This is especially salient when it comes to Russia's tank force, which is increasingly fielding older models that were fully or partially modernized and upgraded, and in some cases not upgraded at all. Therefore, many predictions about Russia's capabilities have to take into consideration the ability to rebuild its force structure in the face of continued losses at the hands of determined and experienced Ukrainian forces. It is likely that in 2024 and possibly into 2025, Russia will continue to draw on its older stocks of Soviet equipment to bolster its forces, as newer equipment will be fielded alongside more numerous systems that are many decades old.

### **Ammunition Shortages**

While Russia dominates Ukraine in terms of artillery advantage, a new RUSI report flags that Russia still faces ammunition manufacturing challenges. While Russia is firing artillery shells at a much higher rate than Ukraine, the rate is still lower than it was in 2022. It is not believed Moscow is producing enough to replenish what it is using. According to Paul Schwartz, a nonresident senior associate with CSIS,

While the ammunition production is improving, Russia is not quite there yet in terms of self-sufficiency. In other words, Russians are still using artillery at faster rates than they can replenish it, although they are closing the gap. To sustain a 10,000 shells per day (and 300,000 shells per month) rate, the Russian defense industrial base would need to produce 3.6 million shells per year.<sup>108</sup>

Beyond achieving self-sufficiency, Russia would require even more ammunition to attain further territorial gains in Ukraine. By the Russian MOD's assessments, it needs to manufacture or source approximately four million 152 mm and 1.6 million 122 mm artillery shells in 2024 to achieve significant territorial breakthroughs in 2025. However, the Russian defense industry has reported it can only increase 152 mm production to 1.3 million and 122 mm production to 800,000 rounds in 2024. While Moscow increased its supplies by seeking out alternative sources of ammunition from other countries, this is not a sustainable solution.<sup>109</sup> With current military industrial production at capacity, the MOD does not believe it can significantly raise production in subsequent years unless even larger investments are made in building new capabilities.<sup>110</sup>

## **Inflationary Pressures**

Russia is experiencing significant inflation. In January 2024, official annual inflation figures came in at 7.28 percent, but a survey commissioned by the Central Bank of Russia (CBR) placed inflation expectations at 12.7 percent and growing.<sup>111</sup> Inflation is driven primarily by elevated government spending to procure supplies and services to support the war effort and by elevated levels of social spending to support the families and dependents of soldiers. Many previously economically depressed Russian regions have benefited from the Kremlin's defense spending splurge, with evidence documenting rising salaries and the expansion of defense-related industries on the ground.<sup>112</sup> Another widely reported area of state subsidization exists in the Russian mortgage sector, where the total value of the mortgage portfolios in Russia's banking system hit a record year-on-year increase of 34.5 percent in 2023, exceeding the increase of 20.4 percent in 2022.<sup>113</sup> An additional contributor to inflationary pressure is the weakened ruble, which in 2023 has repeatedly crossed the symbolic threshold of 100 rubles to the dollar.<sup>114</sup> Due to Russia's high dependence on imported goods, the ruble's sluggishness creates an added expense, acting like a secondary tax on the Russian economy.<sup>115</sup>

To combat inflation, the CBR has raised the interest rate to 16 percent, above that of the National Bank of Ukraine, while Putin issued a temporary decree in October 2023 ordering Russian exporters in major industries to convert nearly all their foreign currency earnings into rubles to boost demand for the Russian currency.<sup>116</sup> Such capital control measures can help stabilize a currency, but they also risk triggering further capital outflows, devaluation, and a spike in inflation.<sup>117</sup>

Overall, the stress on Russian defense industrial enterprises is starting to become public, even as the Kremlin tries to put the most positive spin on the country's economic performance. In a February 2024 communication intercepted by anti-Russian hackers, Dmitry Fadeev, CEO of the Murom Machine-Building Plant, complained that inflation and the shortcomings of Russia's bureaucratic approach prevent plants that form the country's military industrial complex from fulfilling government orders. Further, he said that plants are forced to sell their goods at prices set in 2019

but are at the same time expected to purchase inputs at market prices and in advance.<sup>118</sup> He added that the money received from the government was not enough to cover the interest on the credit his firm would need to take out to pay its suppliers, and this money is tied up until the completion of the government contracts, which normally last three to five years.<sup>119</sup>

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## **Labor Shortages**

The full-scale invasion of Ukraine reinforced the preexisting long-term demographic crisis in Russia.<sup>120</sup> The total number of emigrants since 2022 is estimated at between 817,000 and 922,000 individuals, many of whom are young, well educated, and working in key industries like the information technology sector.<sup>121</sup> Adding to this number are the 300,000 men who were mobilized into the armed forces, plus the 540,000 who, according to official reports, volunteered under contract in 2023.<sup>122</sup> Overall, due to a combination of coronavirus-linked deaths, mobilization, and war-related casualties from 2020 to 2023, Russia's labor pool lost about 1.9-2.8 million people.<sup>123</sup>

This dynamic has negatively affected Russia's dependency ratio (the ratio of pensioners to the overall population), placing further strain on the government budget. It has also contributed to an acute labor deficit. In July 2023, 42 percent of Russian industrial enterprises reported labor shortages.<sup>124</sup> This issue also came up in Fadeev's leaked interview, in which he complained of a shortage of staff at the plants due to war-related mass mobilization and a lack of accommodation in the area.<sup>125</sup> Competition for labor has put upward pressure on salaries, further accelerating inflation.

To mitigate labor shortages, the Kremlin and the Russian business community are working to bring in laborers from other countries, including North Korea, Cuba, and Kenya.<sup>126</sup> Russian industries also turned to hiring teenagers and using prison labor.<sup>127</sup> Despite these atypical measures, the Kremlin strikes a confident tone on questions of employment. In February 2024, President Putin bragged about the creation of over half a million new jobs in the defense sector in the last year and a half and positively remarked on the new employees' capacity to cover multiple shifts on the job.<sup>128</sup>

## **Stretched Arms Exports**

The Russian arms exports industry has faced significant challenges since the early 2010s due to Western sanctions on buyers of Russian weaponry, the development of competing defense industries by large historical customers such as China and India, and a fall in orders from specific customers like the Venezuelan government, which combined put pressure on Russian weapons producers.<sup>129</sup>

The full-scale invasion of Ukraine further exacerbated these challenges. The surplus of Russian defense products available for export abroad has been curtailed, as these materials are needed to supply Moscow's forces. Some evidence suggests Russian arms producers are already overwhelmed by the scale of their domestic orders, thereby impeding sales abroad. Thus, in November 2023, Alexander Mikheyev, the general director of Rosoboronexport, noted that the industry's primary responsibility is to fill orders needed by the Russian military to prosecute its war in Ukraine rather than conclude new contracts with foreign customers.<sup>130</sup> In December 2023, the Russian ambassador in Yerevan reportedly admitted that Russian firms experienced difficulties in fulfilling certain orders purchased by the Armenian military.<sup>131</sup> Russian state-owned media also pointed out that foreign demand for aircraft currently exceeds the production capacity of the Russian military industrial complex given the industry's obligations to domestic clients.<sup>132</sup>

Furthermore, in December 2023, reports emerged that African buyers of Mi-17 helicopters were sending these systems for repairs in Poland, where factories in Lodz maintain capacity to provide upkeep for various Russian-produced helicopter models.<sup>133</sup> Allegedly, Russian firms are currently unable to provide the repairs themselves, as their bandwidth for production is already overstretched by orders for the Russian state.<sup>134</sup> If Russia cannot sufficiently expand capacity, Russian defense exporters risk losing their already vulnerable share of the international arms market.

## **Failing Import Substitution in Critical Areas**

Russia has failed to achieve significant import substitution breakthroughs, particularly in high-tech fields such as mechanical and electrical engineering, robotics, infrastructure projects, biochemistry, and biopharmaceuticals.<sup>135</sup> Putin has personally pointed out deficiencies in Russia's robotics industry.<sup>136</sup> In the metalworking industry, Russia imports 70-90 percent of machine tools and their components.<sup>137</sup> Rostec and the Ministry of Industry and Trade have just announced a delay in the program for the supply of domestic aircraft replacing Western-made aircraft from 2024 to 2025-26. The aviation industry reportedly did not have enough time to test aircraft, and their features did not match those originally announced.<sup>138</sup>

This situation makes many of the Russian industries overreliant on EU and U.S. imports and therefore more vulnerable to sanctions. Specifically, EU countries have remained the main suppliers of components for industries like car construction, computer production, electronics, and optical products. U.S. supplies remain relatively high only in transport engineering due to aircraft manufacturing.<sup>139</sup> According to a CBR survey in March 2023, 13 percent of surveyed companies have experienced a decline in their output due to issues with the import of investment goods.<sup>140</sup> Particularly affected were the companies in the machine-building industry, which reported a 25 percent reduction in output and in wholesale trade (21 percent), construction (17 percent), manufacturing industries (15 percent), and transportation and storage (15 percent).<sup>141</sup>

Dependence on Western-sourced components creates bottlenecks, allowing the West to more effectively leverage the application of sanctions. While up to 40 percent of companies kept purchasing imported equipment and components through third countries, according to the CBR survey, the limited transport capacity of the Russian railways and the volume of traffic through

Russia's southern border crossings have often led to congestion issues. Further complicating the situation are the difficulties connected with making payments and sanctions enforcement by the West. Even existing sanctions have inflated the cost of components, which have risen by 30 percent for the Russian defense sector and have limited Russia's ability to expand supplies, despite extra investment.<sup>142</sup> More efficient sanctions enforcement could further disrupt supply lines.

## Overreliance on China

As previous sections have highlighted, Russia's reliance on China to provide much-needed components is growing, and Chinese imports remain one of the key factors in Russia's ability to sustain its current military status quo. Russia has been replacing many Western products with Chinese ones, from vehicles to computer chips. However, unlike Iran or North Korea, China has not sold large quantities of heavy weapons systems or shells to Russia apart from civilian equipment with dual military uses like drones and trucks.

China's export of technological (such as microelectronic and drone) components proves critical for Russia's manufacturing and assembly. For instance, Russia's industrial sector has become fully dependent on China for machine tools, and components critical to arms manufacturing. By the Russian government's own admission, the domestic drone industry is nearly 95-98 percent dependent on imported parts (especially electronics, engines, steering gears, and batteries), creating a path for potential long-term dependency on the Chinese defense industry.<sup>143</sup> Russian finance minister Anton Siluanov pointed out in October 2023 that "almost all" of Russia's civilian UAVs are being sourced from China.<sup>144</sup>

Such overreliance makes Russia critically dependent on maintaining good relations with China. Moreover, many of the newly imported Chinese components and types of equipment are of inferior quality, being less precise and less accurate and having shorter operational lifetimes in comparison to their Western-produced analogues.<sup>145</sup> The vast volumes of imports also eliminate the incentives for Russian producers to boost import diversification and import substitution. For now, the bilateral relationship between these two states appears firm enough for Moscow not to be concerned about overreliance on China and remains a key foreign policy success for the Kremlin as it competes with the United States and its allies to forge a narrative for its actions in Ukraine.

## Corruption

Historically, endemic corruption has been omnipresent in the Russian military.<sup>146</sup> Bribes are demanded at every level of the armed services, including leave, certification of physical training, military rank, driver's licenses, and avoiding disciplinary action. In the post-invasion period, this expanded to include injury certificates, awards for war participation, and exemptions from being sent on a combat mission.<sup>147</sup>

By multiple reports, at the mid level, Russian officers have exploited their positions to steal wages and fuel, manipulate budget allocations, and use conscripts for personal gain. Corruption spreading within supply chains has reduced the quality and availability of military equipment and supplies.

By the Russian military's own assessments, one in five of Russia's munitions stocks are unsafe due to their age and poor condition despite being routinely fired at Ukraine.<sup>148</sup> Problems have been reported regarding shortages of fuel, equipping troops with non-military-grade radio systems, lack of winter clothing, and unsafe food rations.<sup>149</sup> This has often forced Russian troops to switch to donations and crowdfunding to obtain basic military equipment like medical supplies and night vision goggles.<sup>150</sup>

Corruption exists at a much larger scale at the level of military procurement, particularly in light of the many lucrative opportunities created by increased state funding, as evidenced by people continuously being sentenced for corruption-related crimes. Recent arrests have involved state corporation employees demanding bribes in exchange for funds appropriation.<sup>151</sup> Corruption has systematically increased the cost of domestically procured equipment. It has also been associated with Russia's failures to achieve its goals in import substitution areas. For example, the Russian State Armament Programme has fallen well short of its targets for navy modernization due to decades of mismanagement and corruption.<sup>152</sup> Rostec was recently exposed for having attempted to pass off equipment bought on AliExpress as its own.<sup>153</sup>

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### ***Corruption [inside Russia] has systematically increased the cost of domestically procured equipment.***

Corruption has contributed to the inefficiency of military planning and has undermined the discipline of the Russian army in Ukraine. This was most notable at the start of the war when Russia's invasion plan was obstructed by fuel shortages and poor logistical support, preventing it from capturing Kyiv.<sup>154</sup> While the Kremlin has learned from past mistakes, the sheer scale and pervasiveness of corruption will keep creating unexpected problems going forward.



# Part IV

## *Russia's Strategy in Ukraine in 2024*

In 2024, the Russian military will likely maintain pressure on Ukrainian forces. Russia may attempt different tactics built around certain technologies like drones in order to break through Ukrainian lines. Russia's own rapid advances are also possible, though the Kremlin may be content with watching Ukraine expend its valuable resources, with the situation becoming more complicated for Kyiv as the United States gears up for a presidential election where foreign aid will likely remain one of the key political issues on the ballot.

The prevailing ability of the Russian military to take heavy losses is perhaps the biggest physical and intellectual obstacle to overcome for the Ukrainian military and its U.S. and European allies, who fight in order to avoid as many casualties as possible. The Russian military has sustained massive casualties in manpower and personnel since February 2022, with over 315,000 of Russia's troops having been killed or injured on the battlefield (according to a U.S. intelligence estimate) without significant impact on the quality of the overall fighting force.<sup>155</sup> Nonetheless, the Russian MOD continues to rely heavily on massed infantry attacks, sending large numbers of soldiers in waves against Ukrainian positions with the goal of wearing down Ukrainian defenses.<sup>156</sup> Such tactics may therefore be used again in 2024, though there are indicators the Russian military is shifting toward better-organized combined arms combat.

Despite continuing high casualties, evidence on the front suggests Russia has greater capacity to mobilize. In 2023, Russia was able to sustain latent mobilization through the influx of hundreds of thousands of volunteers drawn to the war due to higher wages and better social benefits.<sup>157</sup> According to the Russian leadership, about 540,000 troops entered military service under contract

last year.<sup>158</sup> Since the start of 2024, an additional 50,000 people have reportedly been recruited for contract service.<sup>159</sup> Some observers expect this mobilization effort to further intensify in the aftermath of the March 2024 presidential election in Russia.<sup>160</sup> The ability to generate additional combat power over time by recruiting contract soldiers for new formations (not just mobilizing soldiers) will give Russia additional advantages on the battlefield.<sup>161</sup> Notably, the Bakhmut offensive relied on numerical superiority in conducting human wave assaults, with Moscow adopting the tactic of exhausting Ukrainian defensive positions with constant assault waves.<sup>162</sup> Despite massive manpower and weapons system losses in the Avdiivka, Bakhmut, Kupyansk, and Lymansk areas, Russia is still building up its forces.

Another advantage is Russia's volume of ammunition. Russia currently produces more ammunition than Ukraine receives and in 2024 is set to produce 1.3 million rounds of 152 mm caliber ammunition and 800,000 rounds of 122 mm caliber ammunition.<sup>163</sup> While, as the previous section on Russia's remaining weaknesses has shown, Russia is currently unable to produce ammunition at the rate needed for self-sufficiency—and its munition imports from allies such as Iran and North Korea may prove unsustainable in the long term—it nonetheless possesses superiority over Ukraine. More precisely, Russia has dominated Ukraine with an artillery fire advantage of 5:1 for much of the battle and sometimes even 12:1.<sup>164</sup> The situation is so dire that Ukraine has started using FPV drones as artillery surrogates.

Military observers noted that Russian successes in 2023 were also due to improved intelligence, surveillance, target acquisition, and reconnaissance operations where aerial drones play pivotal roles.<sup>165</sup> Overall, the Russian military force simply has more resources at its disposal than the Ukrainian military, and it can make up for quality with sheer quantity. It has made massive artillery salvos, has tens of thousands more drones in operation, has arrayed multiple EW systems at the front, has turned to decades-old tanks to plug gaps in the current tank and armored vehicle force, and can send thousands of troops to die. Mass-scale drone use by the Russian military is to be expected throughout 2024, with hundreds of thousands of FPV drones and thousands of commercial quadcopters and military-grade drones providing continuous battlefield observation and enabling drone strikes around the clock.

Overall, analysts admit the ongoing positional warfare will require possessing advanced technologies at scale to change the outcome. The Russian military's resilience in the face of personnel and weapons losses may enable its forces to sustain combat in Ukraine for a number of years.<sup>166</sup> This is particularly true with the absence of any significant pushback from the general population and society. In the near future, Russia will likely continue to maintain pressure on Ukraine's civilian and military infrastructure with strikes by Geran-2 and missile systems, though the overall impact of this strategy is far from clear given that the resolve of the Ukrainian government and citizens appears unshaken in the face of such sustained strikes.<sup>167</sup>

Finally, the Ukrainian government has asked for a number of Western weapons and systems that include artillery shells, air defense complexes, EW systems, counter-UAV technologies, and advanced aircraft as a way to hold back Russian forces. If Ukraine does not get these systems, the attritional balance could further tilt in Russia's direction. This, in turn, could threaten Ukraine's

lengthy stand against and defiance of the Kremlin.<sup>168</sup> Conversely, 2024 might also serve to demonstrate that even at the peak of its defense spending and defense industrial output, with the balance of forces in Moscow's favor, Russia is still unable to achieve its objectives as outlined by Putin in 2022 and again in 2023. In the latter case, with mounting costs by 2025, Moscow might start facing growing uncertainty on the battlefield.

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# Conclusion and Recommendations

Since the onset of its full-scale invasion of Ukraine, Russia's military industrial base has been pressured to boost its domestic production efforts against the backdrop of multiplying losses of different weapons systems and unprecedented Western sanctions and export control measures. While, in the first year of the war, Russia was largely unable to improve its domestic arms production, the analysis shows the Russian MOD was able to increase defense production multiple times over during the second year of the war.

One of the main developments has been the rapid emergence and massive scaling up of Russian civilian and military drones providing significant ISR and assault capabilities to the Russian armed forces, often launched with missiles for a maximum impact. While Russia has also invested in the production of modern tanks, ammunition, and EW systems, CSIS research has revealed Moscow is not self-sufficient and relies on partners such as Iran and North Korea to field enough of these weapons on the battlefield. The analysis has also shown that while Russia indeed improved its domestic arms production capacity in 2023 compared to 2022, it has nonetheless continued to tap into its Soviet-era stockpiles by, for instance, refurbishing and sending its 60- and 70-year-old tanks to Ukraine. Overall, last year saw Russia transition into a long war of attrition while increasingly shifting to low-cost and lower-quality weapons systems.

In this context, in 2023 the Kremlin moved away from Western-made high-end military components toward dual-use or even purely civilian technologies to fuel its war machine. As a consequence, Russia's international suppliers also changed as more and more military goods flowing into Russia were obtained from civilian or dual-use suppliers primarily based in China and Hong Kong, as well

as in Turkey, among others. These shifts in military supply chains have also led to more Russian and foreign companies with a principally civilian footprint finding themselves on sanctions lists. Russia will likely continue following such import diversification efforts in 2024 as well.

The year 2024 may prove decisive for the Kremlin's war effort. The Russian MOD, despite facing a number of weaknesses from labor shortages to entrenched corruption in the field of military procurement, will be able to sustain domestic arms production and import diversification efforts to continue its war effort. Western, and especially U.S., support of Ukraine—now expected to be resumed shortly—will be decisive in containing Russia, as well as curtailing the possibility of a direct future confrontation with Russia.

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### *The year 2024 may prove decisive for the Kremlin's war effort.*

More precisely, Western policymakers trying to support the Ukrainian war effort should do the following:

- **Continue supplying higher-end military equipment to Ukraine at a pace that exceeds Russia's production rate.** This measure should be a top priority for the West, with Western countries focusing on the production of those weapons systems that are most likely to give Kyiv a strategic advantage. According to CSIS's Mick Ryan, "Combat lessons [from Ukraine] must pass quickly from the battlefield to [Western] manufacturers, making it easier for soldiers to influence the production of equipment and munitions."<sup>169</sup> Overall, the dynamic of Russia's war in Ukraine will determine how much of a challenge Russia represents to the West and the international liberal order going forward. The large-scale forward movement of Russian forces in Ukraine would bring the Russian threat directly to Europe's door, making containing Russia more urgent and difficult.<sup>170</sup> Sustaining and increasing military aid supplies to Ukraine, as well as overcoming partisan disagreements on this topic, should therefore remain a priority for the U.S. establishment.
- **Target Russia's oil revenues.** Russia's economic adjustment has become possible due to consistently high oil revenues. The main way to seriously undermine Russia's capacity to increase spending on its defense industrial sector is by targeting its oil revenues, which constitute the major income source for the government's budget. The main economic crises the Soviet Union and Russia experienced since the 1980s were all driven by low oil prices. Western policymakers should also explore more proactive measures to push down the price of Russian oil, following in the footsteps of President Ronald Reagan's early 1980s policy, which contributed to the economic crisis in the Soviet Union. This effort could focus on increasing oil production by countries like Saudi Arabia, decreasing purchases of Russian oil by countries like India and accelerating the clean energy transition. A recent report by the Yermak-McFaul International Working Group on Russian Sanctions outlines other measures feasible in the short term to reduce Russia's oil revenues, including strengthening

enforcement and implementing an initial downward ratchet in the price caps, as well as completing the EU embargo on Russian hydrocarbons.<sup>171</sup>

- **Close sanctions loopholes and enforce existing export controls.** These measures could include introducing more serious penalties for sanctions violations, targeting third-country intermediaries, the “naming and shaming” of sanctions violators, and improving corporate responsibility for supply chain control. Recent examples show the moderate success of such measures. Since the United States started prosecuting tankers transporting Russia’s maritime oil shipments in violation of the oil price caps in October 2023, about half of the sanctioned tankers have failed to load cargoes since they were listed.<sup>172</sup> More effective export controls would also necessitate reinforcing the Bureau of Industry and Security (BIS), using financial sanctions, and improving multilateral cooperation.<sup>173</sup> Another option is to more effectively leverage U.S. financial dominance by targeting banks supporting Russia’s sanctions circumvention.<sup>174</sup> Lastly, a more sensible approach to export control could prioritize selected and more easily enforceable areas, such as Western-made machine tools and components with no identifiable non-Western substitutes.<sup>175</sup>
- **Collaborate with the countries of the Global South.** The Kremlin’s ability to sustain this war is strongly conditioned by its cooperation with third countries. Cooperating with the countries of the Global South that took neutral stances on Russia’s invasion of Ukraine helped the Kremlin undermine Western attempts to isolate Russia on the international stage, reduce its military shortfalls on the battlefield, mitigate the impact of sanctions, and shape an anti-Western axis. The West should counter the Kremlin’s efforts to build these alternative alliances by employing diplomatic tools to boost negotiations with U.S. allies and partners in the Global South. To contest Russia’s leverage in the Global South, the West should prioritize investment, development, trade, and governance rather than military intervention. This effort should also focus on limiting sanctions circumvention by countries like Turkey, the UAE, and others.
- **Begin planning for a strengthened and empowered European defense industry.** Russia represents a growing challenge to the North Atlantic Treaty Organization (NATO). The ongoing large-scale military reforms indicate Russia may be preparing for a confrontation with NATO within the next two decades, including a large-scale conventional war.<sup>176</sup> In light of these risks, Europe must urgently boost its defense production—potentially in cooperation with Ukraine. While some important adjustments are already taking place, their speed remains too slow to deter Russia from such incursions in the future.

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