To Arm a Great Power: A Primer on Rostec State Corporation

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Cover: Russian President Vladimir Putin, accompanied by Rostec State Corporation CEO Sergei Chemezov and First Deputy Prime Minister Denis Manturov, visits the UEC-Kuznetsov manufacturing company in Samara, Russia. Photo: Kristina Kormilitsyna / Sputnik / TT.

Abstract

This report explores the development of Rostec State Corporation, Russia's largest defence-industrial conglomerate, and the challenges it faces in connection with Russia's war against Ukraine. Rostec's founding in 2007 marked the culmination of the state's reassertion of control over the Russian defence industry during the 2000s, driven by the perceived need for oversight of a strategic industry. Its configuration as a "state corporation" subordinated to the Russian president has also shielded Rostec from competing interests in a political system with weak formal protections. Rostec has more than doubled in size and revenues since then, acquiring a monopoly over several major weapons platforms.

Rostec has continued to grow since Russia's full-scale invasion of Ukraine in 2022. Yet the corporation's efforts to increase production have encountered constraints. Consequently, the Russian government has supported the defence industry with subsidies and concessional loans. This development has exposed tensions between the political system and the leadership's wartime materiel needs. Going forward, the constraining factor on Rostec's output will not be the financial sustainability of its enterprises, but rather the state's fiscal capacity, labour supply, access to foreign inputs, and availability of existing equipment stocks. The West's sanctions policy and military support for Ukraine play a key role in this context.

Keywords: Russia, Rostec, industrial organisation, defence industry

Sammanfattning

Denna rapport undersöker det statliga bolaget Rostec, Rysslands största försvarsindustrikoncern, samt de utmaningar som bolaget står inför mot bakgrund av Rysslands krig mot Ukraina. Rostecs grundande år 2007 markerade höjdpunkten i statens återtagande av kontrollen över den ryska försvarsindustrin under 2000-talet, en process som drevs av det upplevda behovet av centraliserad insyn i en strategisk industri. Rostecs särskilda utformning som ett ”statligt bolag” underordnat Rysslands president har också skyddat bolaget från konkurrerande intressen i ett politiskt system med svaga formella skyddsmekanismer. Rostecs storlek och intäkter har mer än fördubblats sedan dess och koncernen har etablerat ett monopol på en rad olika vapensystem.

Rostec har fortsatt att växa sedan Rysslands fullskaliga invasion av Ukraina år 2022. Samtidigt har koncernens satsningar på att öka produktionen stött på utmaningar. Den ryska staten har därför stöttat försvarsindustrin med subventioner och förmånliga lån. Denna utveckling har blottat spänningsfält mellan det politiska systemet och den ryska ledningens behov av krigsmateriel. De främsta begränsande faktorerna för Rostecs produktion framöver kommer inte att vara dess finansiella hållbarhet utan snarare statens finansiella kapacitet, tillgången till arbetskraft, tillgången till utländska insatsvaror, samt tillgången till befintliga vapenlager för återaktivering. Västs sanktionspolitik och militära stöd till Ukraina spelar en nyckelroll i detta sammanhang.

Nyckelord: Ryssland, Rostec, industriell organisation, försvarsindustri

Executive summary

This report provides an overview of Rostec State Corporation (Rostec), Russia's largest defence-industrial conglomerate. In particular, the report explores Rostec's development, governance, business model, and the challenges it faces in the context of Russia's war against Ukraine.

Rostec's founding in 2007 marked the culmination of the state's reassertion of control over the Russian defence industry during the 2000s. This process was driven in large part by the perceived need both for oversight of a strategic industry and for consolidation. Rostec's particular configuration as a "state corporation" can also be understood as an adaptation to Russia's political system. In a setting where personal connections overlap with and often dominate formal institutions, this configuration shields Rostec from competing interests that might otherwise undermine managerial cohesion or state control.

Rostec has grown in size from roughly 400 enterprises in 2008 to over 800 by 2019. Meanwhile, its revenues have doubled in real terms from 2009 to 2021, primarily due to the Russian state's rising defence expenditures during the 2010s. As a result of the conglomerate's expansion, Rostec has acquired a monopoly in a range of major weapons platforms, including main battle tanks, military aircraft, and artillery systems. It has also diversified far beyond the defence sector due to planned defence spending cuts towards the end of the 2010s, as well as reduced arms exports. Rather than growing through modernisation, Rostec has drawn on the political influence of its management and its importance for the Russian leadership's great power ambitions to secure backing for expansion into new markets for government contracts and state funding.

Rostec has continued to grow since Russia's full-scale invasion of Ukraine in 2022, acquiring a number of ammunition and metallurgical plants and growing its revenues by roughly a third in real terms. Yet Rostec and the Russian defence industry have not managed to fully meet the armed forces' needs, while Rostec CEO Sergei Chemezov has complained that the industry faces adverse conditions. Rostec's enterprises have had to continually raise salaries to compete with the armed forces and civilian employers for labour. Sanctions have also made the import of critical inputs more difficult and costly, even if Russian companies continue to find loopholes. Rising costs associated with these issues have further stoked inflation, interest rates, and borrowing costs for industry. Meanwhile, the defence sector's low profitability prevents enterprises from repaying commercial loans without increasing debt, thereby making new loans harder to secure. This has exposed tensions between the political system and the Russian leadership's wartime materiel needs, as centralised control and consolidation have often come at the expense of efficiency. Continued battlefield setbacks could lead Putin to replace Chemezov with a more efficient

technocrat. Such a figure would still face a vast and complex industry beset by structural issues that are unlikely to be resolved by the war's end.

These issues do not, however, represent an existential threat to Rostec or the Russian defence industry more broadly, which has been sustained by subsidies and other forms of state support. The government has required commercial banks to provide defence enterprises with concessional loans on terms set by the state, effectively shifting the risk of defence production from industry to Russia's banking sector. The constraining factor on Rostec's output will not be the profitability or financial sustainability of its enterprises, but rather the state's fiscal capacity, availability of labour (including by coercive means), access to foreign inputs, and availability of existing equipment stocks for reactivation or modernisation; the broader health of Russia's economy may also prove decisive. Further study in these areas is needed to better understand how long Russia's defence industry can sustain the war, and where its limits lie.

Abbreviations

CEO	Chief Executive Officer
CNC	Computer numerical control
FPV	First-person view (drone)
FSVTS	Federal Service for Military-Technical Cooperation (*Federalnaia sluzhba po voenno-tekhnicheskomu sotrudnichestvu)*
GPV	State armament programme (G*osudarstvennaia programma vooruzheniia*)
GOZ	State defence order (*Gosudarstvennyi oboronnyi zakaz*)
IDEX	International Defence Exhibition
KSPZ	Klimovsky Specialised Cartridge Plant (*Klimovskii spetsializirovannyi patronnyi zavod*)
MOD	Ministry of Defence (Russia)
NEO	National Ecological Operator
OAK	United Aircraft Corporation (*Obedinennaia aviastroitelnaia korporatsiia*)
ODK	United Engine Corporation (*Obedinennaia dvigatelestroitelnaia korporatsiia*)
R&D	Research and development
ROE	Rosoboronexport
Rosimushchestvo	Federal Agency for State Property Management (*Federalnoe agentstvo po upravleniiu gosudarstvennym imushchestvom*)
RUB	Russian rouble
SIPRI	Stockholm International Peace Research Institute
TIV	Trend-indicator values
UAV	Unmanned aerial vehicle
US	United States
USD	United States dollars
UVZ	*Uralvagonzavod*
VEB	Vneshekonombank

Content

1 Introduction

The defence industry is not like other industries. A nation's access to arms is fundamental to its ability to defend itself, making the industry a sector of strategic importance in any country. The demands of combat, meanwhile, put a premium on performance and drive the industry's highly technological nature. Moreover, as a result of the defence market's distinct structure, whereby the state acts as the sole buyer on the domestic market (known as a "monopsony") and regulates the arms trade, the sector is defined by a unique state-industry relationship. These conditions shape and place particular constraints on defence firms' conduct and performance, which differ from one country to the next. The United States (US), for instance, produces nearly all major weapons platforms domestically. The American defence industry is largely held in private hands, and while the country's ten largest defence and aerospace companies account for roughly half of all government defence contracts, small and medium-sized enterprises also play an important role in the defence market.[1] Many European countries, on the other hand, are characterised by a mix of state and private ownership, as well as greater reliance on foreign arms suppliers due to, *inter alia*, the smaller size of their economies.

In the case of Russia, a single industrial conglomerate accounts for over half of the country's defence procurement budget and stretches across such disparate civilian sectors as waste processing and medical equipment. Its Chief Executive Officer (CEO) is a close friend of the Russian president and has family ties with the first deputy prime minister. That conglomerate is Rostec State Corporation. In light of Rostec's weight in Russia's defence industry and war against Ukraine, this report aims to provide an overview of Rostec and aims to answer the following questions: How is Rostec governed? How does the corporation's governance shape its conduct and performance? Finally, what challenges does it face in the context of the war?

1.1 Method and Scope

This report analyses Rostec from a political (Chapter 2) and economic (Chapter 3) perspective, and uses these perspectives to compare the conglomerate's conduct and performance before (Chapters 2 and 3) and after (Chapter 4) the Russian invasion of Ukraine in 2022. In doing so, the report aims to situate Rostec's conduct and performance in the wider context of the Russian political and economic system's functioning. It also aims to contribute to debates about the ability of Russia's wartime industry to increase production, though it does not offer a detailed account of production figures for specific enterprises or weapons platforms. In other words, the report provides a comprehensive qualitative overview of the factors governing

1 Vladislav Inozemtsev, "Russia's defense sector: An economic perspective," *Swedish Institute of International Affairs Brief* (March 2019), p. 5, https://www.ui.se/globalassets/ui.se-eng/publications/ui-publications/2019/ui-brief-no.-3-2019.pdf.

Rostec's development, leaving the task of precisely assessing the impact of these factors on performance and output open for future consideration.

1.2 Sources

This report draws on a variety of Russian sources. Wherever possible, the author has used official Russian government and Rostec sources as primary material; these include laws and decrees, official documents, statements by officials, annual reports, press releases, and media interviews. At the same time, official sources are often opaque, incomplete, or framed in an intentionally misleading manner; a situation that has progressively worsened since Russia's invasion. Consequently, third-party sources, such as commercial news reporting, investigative journalism, as well as scholarly and other analytical publications, have been vital for cross-checking and mitigating bias in primary sources, even if they cannot fully address gaps in the available information. Taken together, these limitations mean that, while it is possible to identify broader trends in Rostec's development, precisely assessing the state of the corporation is difficult and should be done with great care.

1.3 Outline

The structure of the report reflects the analytical approach outlined above. Chapter 2 explores Rostec's emergence as a state corporation and its governance. Chapter 3 offers an overview of Rostec's pre-war business model, especially its persistent expansion and revenue strategy. It also considers how Rostec's conduct and performance have been shaped by the corporation's place in Russia's political system. Chapter 4 delves into challenges related to the war. In particular, it notes that although Rostec faces considerable financial headwinds, the corporation has received substantial support from the state due to its importance for the war and ties to the political leadership. Chapter 5 takes stock of the report's findings, outlines key developments to monitor, and reflects on areas for future research.

2 Patrimonialism and Informal Power in Rostec's Governance

The following chapter analyses Rostec's beginnings and governance, leaving the question of how Rostec's governance has shaped its business model to Chapter 3. The first part of this chapter provides a brief overview of the Russian defence industry's development between the fall of the Soviet Union in 1991 and Rostec's founding in 2007. The second part focuses on Rostec's configuration as a "state corporation" and how this differs from other forms of state ownership. The third section outlines how the state corporation model of state ownership has influenced Rostec's governance, as well as the role of informal power in this context.

2.1 The Decline and Reconsolidation of Russia's Defence Industry

In the decade and a half between the dissolution of the Soviet Union in 1991 and Rostec's founding in 2007, the conditions in which the Russian defence industry operated changed dramatically. The 1990s saw a sharp drop in Russian defence spending, and within five years of the Soviet Union's end, defence-industrial output fell to less than a tenth of 1991 levels, while employment in the defence industry was halved. Many defence enterprises survived only by selling existing inventory and servicing equipment, especially for export customers, or else by lobbying for greater state support.[2] This decline was accompanied by a process of partial privatisation, whereby many of the production associations that structured Soviet defence-industrial production were broken up and their pieces sold off.[3] While only about a quarter of defence enterprises ended up fully privatised, this nonetheless led to the fragmentation of long-standing supply chains. Among other things, Russian observers complained that this fragmentation led to excessive competition between Russian firms and undercut the country's position on export markets.[4]

The recovery of the Russian economy and state finances during the 2000s underpinned a gradual restoration of state capacity, as well as efforts to consolidate and reestablish state control over the defence industry.[5] In 2001, for instance, the Russian government adopted the "Programme for Reform and Development of the De-

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2 Richard Connolly, "Sanctions in the Defense Industry," in Richard Connolly, *Russia's Response to Sanctions: How Western Economic Statecraft is Reshaping Political Economy in Russia* (Cambridge University Press, 2018), pp. 120-121; and Stephen J. Blank, "Rosoboroneksport: Arms sales and the structure of Russian defense industry," *Strategic Studies Institute* (1 January 2007), p. 64, https://press.armywarcollege.edu/cgi/viewcontent.cgi?article=1698&context=monographs.

3 Connolly, "Sanctions in the Defense Industry," pp. 120-121.

4 Konstantin Lantratov and Ilya Bulavinov, "Gosudarstvo peredelit oruzhye" [The state will redistribute weapons], *Kommersant,* 14 April 2003, https://www.kommersant.ru/doc/376597.

5 Connolly, "Sanctions in the Defense Industry," p. 121.

fence-Industrial Complex for 2002-2006," which outlined plans to merge enterprises into "integrated structures" based on state-owned holding companies.[6] The growing preference for reconsolidation and renationalisation of the industry, expressed by President Vladimir Putin and in various corners of the government and state apparatus, was often articulated in terms of the defence sector's strategic nature and the state's unique capacity to steer its development in line with the national interest, whether it be economic growth, technological development, or global power.[7]

2.2 State Corporations: A Unique Form of Ownership

Rostec (initially "Rostekhnologii") was established in November 2007 at the high-water mark of this process, via presidential decree. At its founding, Rostec's purpose was to "[promote] the development, production and export of high-tech industrial products," including by "attracting investments in […] the military-industrial complex."[8] This somewhat loose mission grants it a broad remit that extends beyond any one activity or defence-industrial segment. Rostec also differs from other Russian defence-industrial entities in its legal form, which has been pivotal in its development.

Rostec was founded as a "state corporation" and is governed by Federal Law No. 7 (1996) "On Non-Profit Organisations."[9] Many Russian state-owned companies are referred to as "state corporations" in the media, but only six entities are legally defined as such, including Rostec, Rosatom, Roscosmos, and Vneshekonombank (VEB).[10] Rostec's status as a "non-profit organisation" means that, in addition to the mission cited above, its tasks include "the performance of social, managerial or other societally beneficial functions."[11] It is worth noting that this role may, at times, conflict with other priorities. For instance, while the government often describes the defence industry as a driver of the country's technological and economic development, it also subsidises loss-making enterprises to prevent lay-offs and social unrest, especially in regions where defence enterprises represent a major source of employment.[12]

Perhaps the most important characteristic of state corporations compared to other forms of state ownership is that the former are directly owned by the Russian

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[6] *Ibid;* and Julian Cooper, "Appendix 9C. Developments in the Russian arms industry," in *SIPRI Yearbook 2006, SIPRI*, p. 437, https://www.sipri.org/yearbook/2006/09/appendix9C.
[7] Blank, "Rosoboroneksport," pp. 13–14.
[8] Federal Law On State Corporation "Rostekhnologii," no. 270-F3, 23 November 2007.
[9] Federal Law On Non-commercial Organisations, no. 7-FZ, 12 January 1996.
[10] A.S. Yegrashev and E.V. Maslennikova, "Rol gosudarstvennykh korporatsyi v ekonomike Rossii (na primere gosudarstvennykh korporatsyi «Rosatom» i «Rostekh»" [The role of state corporations in Russia's economy (on the example of state coporations "Rosatom" and "Rostec")], *RUDN Journal of Public Administration*, vol. 7, no. 4 (2020), p. 305, https://doi.org/10.22363/2312-8313-2020-7-4-303-315.
[11] *Ibid.*, p. 304.
[12] Pavel Luzin, "Russia's Defense Industry and Its Influence on Policy: Stuck in a Redistributive Feedback Loop," *Russia Matters*, 3 November 2021, https://www.russiamatters.org/analysis/russias-defense-industry-and-its-influence-policy-stuck-redistributive-feedback-loop.

Federation and administratively subordinated to the Russian president. The president therefore has the right to appoint and dismiss chief executives and all members of the supervisory board.[13] By contrast, other state-owned enterprises are often managed by the Federal Agency for State Property Management (Rosimushchestvo), which is accountable to the government, represented by the deputy prime minister responsible for defence industry. State corporations also have the right to keep their profits and have full discretion in contracting and investments.[14] In addition, as a state corporation, Rostec is required to present an annual report to the Accounts Chamber of Russia but is otherwise subject to much lower disclosure requirements than other state-owned entities. Consequently, government bodies have extremely limited means with which to monitor and control the work of state corporations. For instance, in its 2009 and 2014 reports on the functioning of state-owned entities, the Accounts Chamber singled out state corporations for their opacity and remarked upon the difficulty of maintaining oversight by the Ministry of Justice, the Federal Tax Service, and the Audit Chamber.[15]

2.3 The Role of Informal Power

In view of the relative weakness of formal non-presidential controls on Rostec's operations, it is useful to consider the role of the Russian president and informal power in the corporation's governance. The analysis here takes as its starting point the concept of patrimonialism, defined by Vladimir Gelman as "a politico-economic order based upon appropriation of public political and economic power for private purposes." The manifestation of patrimonialism in modern societies and its intermingling with formal bureaucracies is often termed neopatrimonialism, which Gelman also uses to refer to Russia's politico-economic order.[16] Other scholars, such as Henry E. Hale[17] and Alena Ledeneva,[18] use terms such as patronal politics and informality, respectively, in their research on Russia's political economy. Both emphasise the influence of informal networks based on personal connections over formal institutions that function according to an impersonal logic. Given the importance of personal connections and informal networks in Russia's political and eco-

[13] Nicole Krome, "State Corporate Governance in Russia," *Europe-Asia Studies,* vol. 74, no. 8 (October 2022), p. 1359, https://doi.org/10.1080/09668136.2021.1988905.

[14] Alla Kassianova, "Enter Rosoboronexport," *PONARS Policy Memo No. 406* (July 2006), p. 5, https://ponarseurasia.org/wp-content/uploads/attachments/pm_0406.pdf.

[15] Krome, "State Corporate Governance," p. 1359.

[16] Vladimir Gelman, "The vicious circle of post-Soviet neopatrimonialism in Russia," *Post-Soviet Affairs,* vol. 32, no. 5 (2016), p. 458, http://dx.doi.org/10.1080/1060586X.2015.1071014.

[17] Henry Hale, "Russian Patronal Politics Beyond Putin," *Daedelus* (2017), pp. 31–32, https://doi.org/10.1162/DAED_a_00432; Gelman, "The vicious circle," p. 458. See, also: Henry Hale, *Patronal Politics: Eurasian Regime Dynamics in Comparative Perspective*, Cambridge University Press, 2014.

[18] Gelman, "The vicious circle," p. 458. See, also: Alena Ledeneva, *Can Russia Modernise? Sistema, Power Networks and Informal Governance*, Cambridge University Press, 2013.

nomic life, perhaps the best place to begin studying Rostec's governance is with the relationship between Sergei Chemezov, its CEO, and President Putin.

Prior to his career in the defence industry, Chemezov joined the KGB and ran a scientific and technological surveillance operation from 1983 to 1988 in Dresden, East Germany. There, he met and befriended Putin, who was also his colleague and neighbour.[19] According to Chemezov, the pair maintained personal relations and visited each other after Dresden. In 1996, Putin, at that time deputy chief of the Russian Presidential Property Directorate, recommended Chemezov for the post of head of the Department of Foreign Economic Relations.[20] Chemezov worked at the department until 1999, when he was selected by Putin, now Russia's prime minister, to lead Promexport, which, along with Rosvooruzhenie, was one of Russia's two state arms export intermediaries. A year later, these were merged by presidential decree into a single state arms export agency, Rosoboronexport (ROE). Putin, at this point Russia's president, appointed Chemezov first deputy CEO and eventually CEO of ROE in 2004.[21] Finally, in November 2007, he appointed Chemezov CEO of the nascent Rostec. As of early 2026, Chemezov remains at the helm of Rostec.[22]

The management of the corporation and nominations to the management board are formally subject to the oversight and approval of the supervisory board, which consists of at least four representatives of the Russian president and four representatives of the government, all of them appointed by the president.[23] At the same time, professional relationships in Rostec's governance bodies and enterprises often overlap with informal networks that run counter to formal lines of accountability. These networks serve multiple functions, such as maintaining personal control over Rostec's management. Chemezov's relationship with the chairman of Rostec's supervisory board and Russia's current first deputy prime minister, Denis Manturov, is particularly important in this regard. In his capacity as chairman of the supervisory board, Manturov's role is to ensure that Rostec's operations are in line with state policy and the law. Yet he and Chemezov share a personal relationship that predates Rostec. Manturov's career includes several stints in the defence industry, including Oboronprom (CEO, 2003–2007), a subsidiary of ROE and later of Rostec.[24] It was

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[19] Irina Dolinina, "A Family Affair: How the Relatives of a Russian State Company's CEO Got Rich," *Organized Crime and Corruption Reporting Project,* 8 October 2021, https://www.occrp.org/en/project/the-pandora-papers/a-family-affair-how-the-relatives-of-a-russian-state-companys-ceo-got-rich.

[20] Andrei Bandenko, "Человек во всеоружии [A man fully armed]", *Itogi*, 31 October 2005, archived link: https://web.archive.org/web/20220124132329/https:/itogi.ru/archive/2005/44/62260.html.

[21] Louis-Marie Clouet, "Rosoboronexport, Spearhead of the Russian Arms Industry," *Ifri Russie.Nei.Visions*, no. 22 (September 2007), p. 5, https://www.ifri.org/ru/zapiski-ifri/rosoboroneksport-rossiyskiy-oruzheynyy-baron.

[22] Rostec, "About," accessed 16 February 2026, https://rostec.ru/about/.

[23] Federal Law On State Corporation "Rostekhnologii," no. 270-F3.

[24] Government of the Russian Federation, Denis Valentinovich Manturov, http://government.ru/gov/persons/175/bio/. Although some sources describe Manturov as "Chemezov's man," his involvement in the defence industry began prior to Chemezov's rise via Promexport in 1999, and his career progression was reportedly in large part aided by his father, a former diplomat (see Pavel Luzin, "The Inner Workings of Rostec, Russia's Military-Industrial Behemoth," *Kennan Institute*, 1 April

at Oboronprom that Manturov crossed paths with Chemezov, who was CEO of ROE from 2004 and chairman of Oboronprom's board of directors. The two men are also friends and business partners via their respective family members. For instance, Denis Manturov's father, Valentin Manturov (deceased in 2019), and Sergei Chemezov's son, Stanislav Chemezov, ran several businesses together, including real estate, restaurants, and a winery.[25] Thus, in addition to his connection to Putin and independence from other institutions, Chemezov's relationship with Manturov provides him with a powerful ally on Rostec's supervisory board, ensuring greater influence over the corporation's affairs.

Chemezov's power to appoint friends and associates to Rostec and its subsidiaries' management boards also ensures that subordinates' interests are more closely aligned with his own and prevents conflict within the corporation's management.[26] For instance, Chemezov's first deputy, Vladimir Artiakov, was also Chemezov's deputy at Promexport and ROE, and assisted in the acquisition of various Russian companies, such as Russia's leading car manufacturer, AvtoVAZ. In addition, the chairman of Rostec subsidiary Nacimbio, Vitalii Mashchitskii, is a childhood friend of Chemezov's, and many of Rostec's key management positions are held by Chemezov's associates from his time managing ROE.[27]

These informal networks and alliances are underpinned not only by personal relations but also mutually beneficial rent-seeking opportunities. For example, during Manturov's tenure at Oboronprom, the holding received state funding to acquire several companies via a private intermediary that obtained the target companies' shares at below-market prices, which were then sold to Oboronprom at an inflated price. The inclusion of an intermediary was arguably redundant and likely served as a vehicle for diverting state funds into the pockets of the broker and Oboronprom insiders.[28] Other examples of graft include the 2012 acquisition of a Rostec asset in the waste-processing industry by an associate of Chemezov, also at below-market prices.[29]

2019, https://www.wilsoncenter.org/blog-post/the-inner-workings-rostec-russias-military-industrial-behemoth). In this regard, the Chemezov-Manturov relationship might more appropriately be described as a "tandem" rather than hierarchical.

[25] RBC, "Semeinyi podriad: rodnye Manturova i Chemezova postroiat otel v Gelendzhike" [Family business: Relatives of Manturov and Chemezov will build a hotel in Gelendzhik], *RBC,* 24 May 2018, https://kuban.rbc.ru/krasnodar/24/05/2018/5b06b5699a794735ca4db800.

[26] In one comparison of Rostec's governance with that of OAK, the United Aircraft Corporation (before its integration into Rostec in 2018), Nicole Krome found that OAK's governance model, subject to greater government control and disclosure requirements, has resulted in poorer financial performance and fulfilment of modernisation goals. See Krome, "State Corporate Governance in Russia," pp. 1367–1374.

[27] *Ibid,* pp. 1360–1362.

[28] Aleksei Rafalovich, "Novaia kormushka komandy Chemezova" [New feeding trough of Chemezov's team], *Agentstvo Politicheskikh Novostey (APN) Severo-Zapad*, 4 August 2009, http://www.apn-spb.ru/publications/article5904.htm.

[29] Yekaterina Selivanova, "Krupneishye musornye proekty v Rossii poluchili za beztsenok doverennye liudi glavy Rostekha" [Rostec head's trusted people got the largest waste projects in Russia for next to nothing], *Organized Crime and Corruption Reporting Project (OCCRP),* 5 March 2024, https://www.occrp.org/ru/novosti/vaznye-istorii-i-proekt-krupneisie-musornye-proekty-v-rossii-polucili-za-bescenok-doverennye-liudi-glavy-rostexa.

These personal ties also encompass various decision-making centres of importance for the defence industry. For instance, Chemezov's former assistant at ROE and deputy at Rostec, Dmitri Shugaev, currently heads the Federal Service for Military-Technical Cooperation (FSVTS), a key node in the approval process for defence and dual-use exports.[30] Meanwhile, Manturov's role extends well beyond Rostec's supervisory board. Following his tenure in the defence industry, he later joined the Russian government as Minister of Industry and Trade from 2012 to 2024, where he oversaw key files related to the defence industry. In July 2022, he was appointed Deputy Prime Minister for defence and space industry, and in May 2024, he became First Deputy Prime Minister responsible for coordination of government policy related to defence industry, including the state programme "Development of the Military-Industrial Complex."[31] As discussed in greater detail in subsequent chapters, these networks provide Chemezov with access to state resources and political influence. These, in turn, have helped him secure backing for acquisitions and funding for the defence industry.

Rostec's founding as a state corporation subordinated to the Russian president and managed by his trusted friend also serves as a form of protection for the conglomerate. In a system where formal institutions are weak, leaving Rostec outside the president's control would have rendered it vulnerable to attacks from potential alternative power bases or left it neutered by rival interests in its management. Indeed, according to Nicole Krome, this fate befell United Aircraft Corporation (hereafter referred to by its Russian abbreviation, OAK), which, prior to its incorporation into Rostec in 2018, was hamstrung by fragmented interests between the four ministries overseeing its management.[32] When viewed in this light, Rostec's distinct legal status emerges as not only the culmination of the Russian political executive's growing control over the country's defence sector during the 2000s, but also as a means to formally entrench Putin's informal control over a large share of the industry.

The case of Chemezov and Rostec epitomises the informal power structures that have become characteristic of the Russian political system under Vladimir Putin. This model of governance allows the Russian political leadership to maintain oversight and control over a strategic sector, as well as the implementation of state defence-industrial policy. The case also highlights how the boundaries between state and personal power are blurred in this system. The next chapter examines how Chemezov's informal power and relative independence in managing Rostec has contributed to the corporation's growth and propelled the corporation to its dominant position in the Russian defence industry.

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[30] Clouet, "Rosoboronexport," p. 6; Lantratov and Bulavinov, "Gosudarstvo peredelit oruzhye"; Union of Machine-Builders of Russia, Shugaev Dmitri Yevgenievich biography, https://soyuzmash.ru/people/shugaev-dmitriy-evgenevich/.

[31] Government of the Russian Federation, Denis Valentinovich Manturov.

[32] Krome, "State Corporate Governance in Russia," pp. 1370-1371.

3 Rostec's Pre-War Business Model

This chapter turns to the subject of Rostec's growth and highlights some key features of its business model. This model largely rests on two dynamics, namely expansion and diversification via political influence – including a gradual shift from exports to domestic markets and from military to civilian production – and profits by way of monopoly and privileged access to state resources.

3.1 The "Russian Vacuum Cleaner": Expansion and Diversification

Soon after Rostec's founding in November 2007, 426 enterprises were transferred to the corporation by presidential decree in July 2008, including nearly 200 assets that were bankrupt, out of operation, inoperative, or in a "pre-crisis and crisis state"; the total debt for these entities amounted to RUB 630 billion.[33] This transfer was motivated by the expectation that consolidation and more effective management practices would help revive these companies, and prepare at least some of them for future privatisation. By 2019, Rostec had expanded to over 800 entities, while its revenues have quadrupled from roughly RUB 511 billion in 2009 to over RUB 2 trillion in 2021. In real terms, Rostec's revenues roughly doubled from 2009 to 2021, a more moderate yet still notable result (see Table 1). This growth has to a great extent been underwritten by an increase in government spending on defence procurement: the state defence order's (GOZ) share in the corporation's revenues surged from roughly 20 per cent in 2009 to circa 44 per cent in 2015.[34]

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[33] Rostec 2014 Annual Report (2015, in Russian), p. 14, https://www.rostec.ru/upload/iblock/2c5/2c5b458cd9eedd83fe4c4393a21d8c62.pdf.

[34] Rostec 2009 Annual Report (2010), pp. 21–22, https://web.archive.org/web/20140704000319/http://rostec.ru/content/files/reports/Godovoy_otchet_2009.pdf (archived link); and Rostec 2015 Annual Report (2016), pp. 168–171, https://web.archive.org/web/20241005082034/http:/rostec.ru/content/files/documents/GODOVOY_OTCHET_2015.pdf (archived link). Rostec's disclosures on its participation in the GOZ began to drop sharply after 2013 and almost disappeared entirely after 2015. Note that this estimate is based on Rostec's reporting of "completed" (*vypolnennykh*) contracts, and does not necessarily correspond with the amount of funds received for completed contracts in a given year. In its 2009 Annual Report, for instance, Rostec stated that it experienced financial difficulties due to the late submissions of GOZ assignments, signing of contracts, and disbursement of advance payments. Given source limitations, the figures given here are intended as indicative estimates.

Table 1 Rostec's consolidated revenues in both nominal and 2009 constant prices, and consolidated net profits.

	2009	2010	2011	2012	2013	2014	2015	2016
Consolidated revenue (RUB, billions, 2009 constant prices)	511,0	581,9	707,9	756,9	763,6	661,4	692,4	729,6
Change compared to previous year (%)	*NA*	*13,9%*	*21,7%*	*6,9%*	*0,9%*	*-13,4%*	*4,7%*	*5,4%*
Consolidated revenue (RUB, billions, current prices)	*511,0*	*633,0*	*817,0*	*931,0*	*~1,000.0*	*964,5*	*1140,0*	*1266,0*
Consolidated net profit (RUB, billions, current prices)	-64,0	15,0	46,0	38,5	40,0	33,9	99,0	88,0
Consolidated net profit margin (%)	*NA*	*2,4*	*5,6*	*4,1*	*4,0*	*3,5*	*8,7*	*6,9*
	2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Consolidated revenue (RUB, billions, 2009 constant prices)	893,4	885,8	927,1	936,7	949,8	869,9	1086,9	1261,5
Change compared to previous year (%)	*22,5%*	*-0,9%*	*4,7%*	*1,0%*	*1,4%*	*-8,4%*	*24,9%*	*16,1%*
Consolidated revenue (RUB, billions, current prices)	*1589,1*	*1642,7*	*1771,6*	*1877,8*	*2063,9*	*2116,0*	*2840,0*	*3610,0*
Consolidated net profit (RUB, billions, current prices)	121,3	128,1	179,2	111,2	163,5	39,0	60,1	131,5
Consolidated net profit margin (%)	*7,6*	*7,8*	*10,1*	*5,9*	*7,9*	*1,8*	*2,1*	*3,6*

Source: Rostec Annual Reports for the years 2009–2021 and Chemezov's presentations of Rostec's annual results to Putin, 2022–2024.

Rostec's expansion throughout the 2010s included a number of notable acquisitions in the defence sector. In addition to the integration of ROE into Rostec in 2011, the corporation also acquired Uralvagonzavod (UVZ, Russia's sole manufacturer of new main battle tanks) in 2016 and OAK (Russia's primary aircraft manufacturer) in 2018, both by presidential decree (see Figure 1 for an overview of Rostec's structure).[35] As with its earliest acquisitions, these transfers were often justified with reference to the companies' precarious financial states and the need for effective management, as well as state control over strategic assets. Consequently, the conglomerate has come to

[35] Rostec 2018 Annual Report (2019), pp. 77, 174, https://rostec.ru/upload/iblock/587/587257de247709537226335c9b40b76a.pdf; Ivan Safronov and Natalia Skorlygina, "Zabralvagonzavod," *Kommersant*, 28 December 2016, https://www.kommersant.ru/doc/3182867; Russian Aviation Insider, "Rostec gains control over Russia's United Aircraft Corporation," *Russian Aviation Insider*, 25 October 2018, https://www.rusaviainsider.com/rostec-gains-control-russia-united-aircraft-corporation/.

dominate armoured vehicle production and acquired a monopoly on military aircraft, main battle tanks, and artillery systems, accounting for over a quarter of Russia's GOZ in the years leading up to the Russian invasion of Ukraine in 2022.[36] In this sense, it is perhaps better described as a 'holding of holdings', rather than as a conventional corporation or conglomerate. It is worth mentioning that while Rostec occupies a dominant position in the Russian defence industry, it is not a monopolist across the full spectrum of military platforms. Notable defence-industrial entities outside Rostec include Roscosmos (ballistic missiles), Rosatom (nuclear warheads), Almaz-Antei (air-defence systems), Tactical Missiles Corporation, or KRTV (missiles), and United Shipbuilding Corporation (military shipbuilding).[37] Like Rostec, Roscosmos and Rosatom are state corporations.

From the mid-2010s, however, Rostec's leadership began placing greater stress on diversification into civilian markets. This was driven in large measure by projected decreases in defence orders after the end of the state armament programme (GPV) 2011–2020. In his annual address to the Federal Assembly in December 2016, Putin set civilian production targets for the defence industry of 30 per cent by 2025 and 50 per cent by 2030 in order to maintain the industry's long-term financial sustainability.[38] This objective was echoed in the chairman's address in Rostec's 2017 Annual Report, where Manturov stated that the corporation was betting on diversification into civilian production for its future growth in light of planned cuts to the GOZ.[39]

This development can also partly be ascribed to falling arms export revenues. Exports have traditionally been an important source of income for Russia's defence industry due to structural problems in the government's defence contracting system, which fixes prices at low levels and backloads payments, forcing enterprises to borrow and go into debt to finance production.[40] Exports also drive economies of scale that allow the industry to reduce unit costs. In international markets, Russia benefits from additional demand and "captive markets," that is, buyers who either cannot afford, cannot access, or do not want more high-end, expensive, and tightly

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36 Rostec 2019 Annual Report (2020), p. 123, https://web.archive.org/web/20220128065406/https:/rostec.ru/upload/iblock/baf/baf448d95ffa8611fad46e0df57032df.pdf (archived link); and Rostec 2020 Annual Report (2021), p. 78, https://rostec.ru/upload/iblock/f16/p9uys0xhnyvgqhyfvmvqb9430t4lifk8.pdf.

37 Only Rostec and United Shipbuilding Corporation feature in the SIPRI Top 100 arms-producing and military services companies in the world in 2024, with United Shipbuilding Corporation's total revenues assessed to be a little under 13 percent of Rostec's total. See https://www.sipri.org/visualizations/2025/sipri-top-100-arms-producing-and-military-services-ompanies-world-2024.

38 Presidential Address to the Federal Assembly, *Kremlin.ru*, 1 December 2016, http://en.kremlin.ru/events/president/news/53379.

39 Rostec 2017 Annual Report (2018), p. 4, https://web.archive.org/web/20211013114725/, https:/rostec.ru/upload/iblock/e51/e51272bbcf59ce3ce8320cdabf668a1d.pdf (archived link).

40 Mathieu Boulègue, "Russia's struggle to modernize its military industry," *Chatham House*, 21 July 2025, pp. 4–5, https://www.chathamhouse.org/sites/default/files/2025-07/2025-07-21-russia-struggle-modernize-military-industry-boulegue.pdf.

controlled Western arms.[41] In Rostec's case, military and dual-use exports accounted for roughly 14 to 35 per cent of revenues from 2009 to 2016, after which the corporation's reporting on its exports dropped sharply (see Table 2). While official disclosures have grown scarce in recent years, the Stockholm International Peace Research Institute's (SIPRI) data on Russian exports of major conventional weapons indicates that exports began falling from 2011, followed by a brief recovery during 2015–2018 and a more rapid decline thereafter.[42] Rostec's share in Russia's total arms exports increased as a result of its acquisitions of UVZ and OAK in 2016 and 2018, respectively, though the corporation's reliance on exports has fallen since then. Precisely assessing the extent of this reduction is difficult, however, given the opacity of official sources, as well as certain discrepancies between Rostec and SIPRI data. In any case, Rostec does not appear to be pinning its hopes on arms exports for its long-term development, notwithstanding Chemezov's often boastful statements. For instance, the corporation's 2018 Annual Report notes that while Russian arms exports are stable, international arms markets are conservative, growing only by roughly 1 per cent per annum.[43]

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41 Clouet, "Rosoboronexport," p. 8.
42 Stockholm International Peace Research Institute (SIPRI), Arms transfers database, https://armstransfers.sipri.org/ArmsTransfer/TransferRegister. Rostec's exports are discussed in greater detail in Chapter 4. See Figure 2 included therein.
43 Rostec 2018 Annual Report, p. 45.

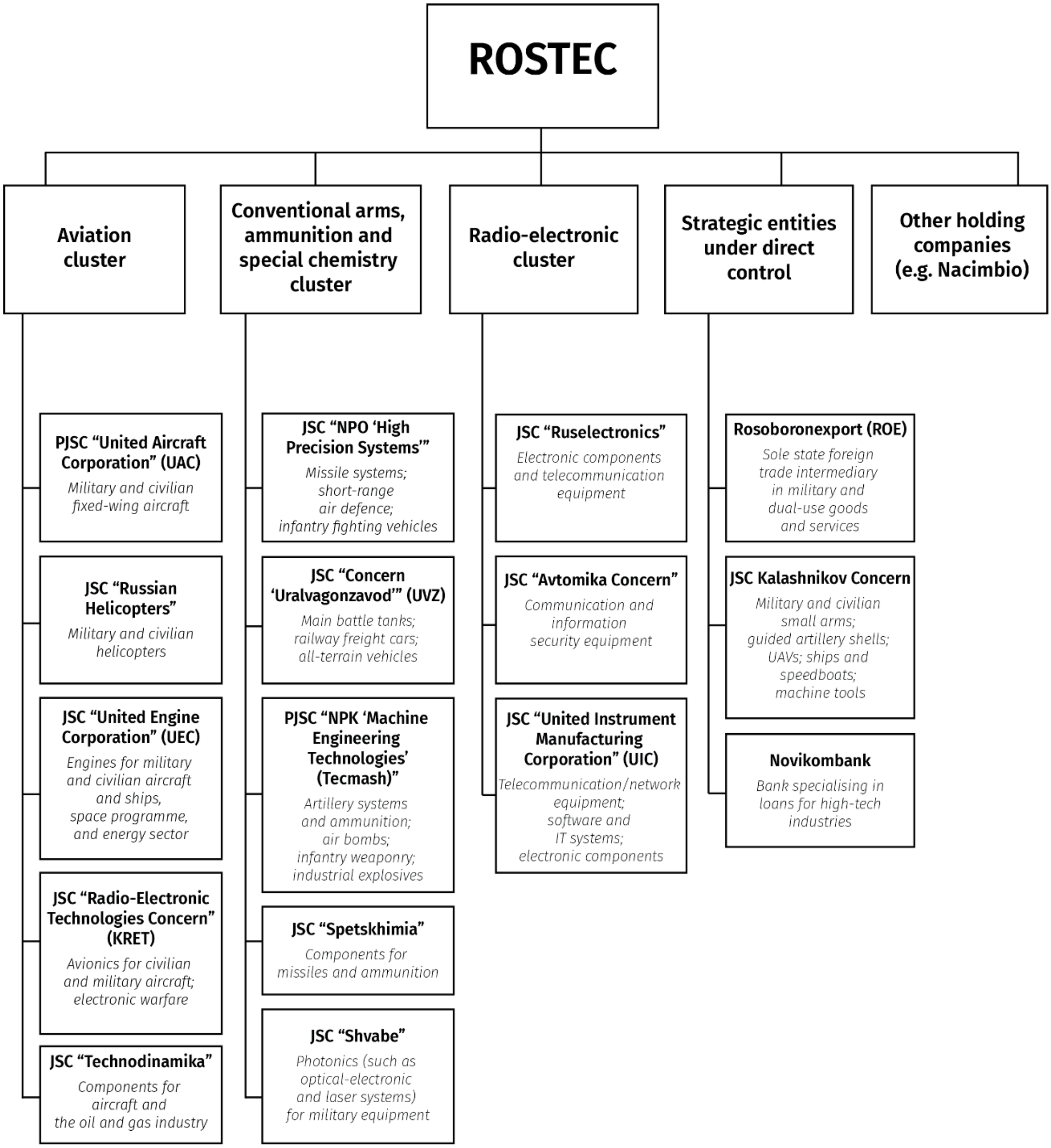

Figure 1. Rostec organisational structure (as of 2021).
Source: Rostec Annual Reports for 2019, 2020, and 2021, author's compilation.
Notes: (P)JSC: (Public) Joint-stock Company; NPO: Scientific Production Association; NPK: Scientific Production Concern. Note that neither the selection of entities nor their descriptions is exhaustive. The selection is based on the Annual Reports' "Review of key holding companies and groups of companies' activities." The composition of Rostec and its individual clusters, as well as the activities of entities listed above, may have changed since 2022.

Table 2 Rostec military and dual-use exports 2009–2016, current prices, billions, per cent.

	2009	2010	2011	2012	2013	2014	2015	2016
Total Rostec defence exports (USD)	2,6	2,9	4,9	5,2	6,7	7,1	6,5	5,6
RUB equivalent (based on Russian Central Bank exchange rates averaged over one year)	*82,6*	*86,9*	*143,4*	*162,5*	*214,7*	*272,9*	*400,4*	*374,2*
Rostec exports (excluding ROE commission) as a share of total revenues (%)	*16,2*	*13,7*	*17,6*	*17,5*	*21,5*	*28,3*	*35,1*	*29,6*
ROE export order book (USD)	NA	38,5	34,6	38,3	38,3	NA	49,5	42,7

Remarks: Rosoboronexport (ROE) was integrated into Rostec in 2011.
Source: Rostec Annual Reports for the years 2009–2016.
Notes: As with Rostec's disclosure of participation in the SDO, the corporation began to limit its reporting of export figures from 2016. In recent years, Rostec has only reported on ROE's export order book and the aggregate value of new export contracts signed in a given year, rather than delivered contracts; when precise figures are given, they usually refer only to specific products or individual Rostec holdings, rather than to the corporation as a whole. Moreover, as an intermediary, ROE's declared exports are not the same as its revenues, which come from commissions on sales and informal rents (kickbacks). Consequently, the author used a conservative estimate based on Rostec's independent exports and declared share of ROE exports, converted from US dollars (USD, the currency in which export contracts are denominated) to Russian roubles (RUB) using the Russian Central Bank's average exchange rates for the given years: https://www.cbr.ru/eng/currency_base/dynamics/. Note that the rapid increase in the RUB value of exports after 2013 is at least in part a result of the devaluation of the rouble against the dollar, as well as the irregular nature of demand in arms markets, where major contracts can drive revenue up sharply.

In the Russian discourse, Rostec and the Russian defence industry's pursuit of civilian production has often been termed both "conversion" and "diversification," though these concepts refer to separate, albeit related, processes.[44] Conversion refers to the repurposing of defence assets and personnel towards civilian production, often known as "resource reuse".[45] Meanwhile, diversification can refer to the procurement of capital and personnel geared towards civilian production. In practice, these definitions are blurry and overlapping, as conversion might, for instance, involve defence enterprises investing in physical capital that would allow them to reorient existing assets towards the civilian market. During the "peace dividend" of the 1990s, conversion pertained to companies' exit from the defence market, whereas in the current Russian context it relates to an increase in civilian production without reducing military output capacity.[46] Rostec appears to have pursued both conversion and diversification, redirecting defence enterprises towards civilian production to compensate for lulls in state defence and export orders, while acquiring civilian

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44 V. G. Sheludko, "Konversiia predpriiatii oboronno-promyshlennogo kompleksa i puti prodvizheniia grazhdanskoi produktsii na rynok" [The conversion of the military-industrial complex enterprises and ways of promoting civilian products on the market], *Social and Economics Systems Management*, no. 1 (2018), pp. 5-12, https://cyberleninka.ru/article/n/konversiya-predpriyatiy-oboronno-promyshlennogo-kompleksa-i-puti-prodvizheniya-grazhdanskoy-produktsii-na-rynok.

45 Michael Brzoka, "Chapter 34: Success and Failure in Defense Conversion in the 'Long Decade of Disarmament,'" in Todd Sandler and Keith Hartley (eds.), *Handbook of Defense Economics. Volume 2: Defense in a Globalized World* (2007), p. 1180.

46 Maria Solodilova, "Goskorporatsiia «Rostekh» kak aktor sovremennykh politicheskikh protsessov" [State corporation "Rostec" as an actor in contemporary political processes], *Society: Politics, Economics, Law*, no. 5 (2021), p. 32, https://doi.org/10.24158/pep.2021.5.5.

companies to cross-subsidise its defence holdings during such breaks in military demand. For instance, the corporation has received state funding for conversion via the federal target programme (*federalnaia tselevaia programma*) for "Development of the Defence-Industrial Complex of the Russian Federation for 2011–2020."[47] In addition, in 2017, Rostec launched an agency called NPO "Konversiya" together with the state-owned development corporation VEB as a "one-stop shop" for the promotion of civilian products produced by the defence industry.[48]

As a result of this drive, Rostec's holdings have grown well beyond defence and related industries. In addition to its presence in defence-adjacent sectors such as civilian aerospace, automobiles, machine tools, and engine manufacturing, Rostec is also active in finance, waste processing, and incineration, as well as the medical equipment and pharmaceutical industries. While it is not unusual for defence enterprises to produce for the civilian market due to economies of scope or the inherently dual-use nature of certain industries (such as military and civilian aerospace), such benefits are less self-evident in more far-flung sectors.[49] Consequently, Rostec's expansion into an array of different industries has earned it the moniker "*Rospylesos*" (in English: "Russian vacuum cleaner"), and has drawn criticism from civil society and then minister of economic development (and current governor of Russia's Central Bank) Elvira Nabiullina as incommensurate with the ostensible needs of defence-industry optimisation.[50] While it is difficult to disaggregate the relative weight of conversion and diversification in Rostec's civilian reorientation, the corporation reportedly reached Putin's 30 per cent mark by 2018 and 45.5 per cent by 2021 (see Table 3).

Just as with Rostec's defence-industrial acquisitions, these civilian acquisitions have been justified by Chemezov with reference to companies' financial difficulties and Rostec's ostensibly effective management. In one 2019 interview, for example, an RBC journalist referred to Rostec as an "asset store," to which Chemezov responded that "We are not a store, but rather an intensive care unit, where assets are put on their feet."[51] Rostec has, indeed, not only acquired but also subsequently sold shares in companies in order to raise funds. In 2013, for instance, Rostec sold a 49 per cent

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47 Rostec 2017 Annual Report, p. 205; and Government of Russia, Resolution No. 425-8, "On approval of the state program of the Russian Federation 'Development of the military-industrial complex,'" 16 May 2016, http://static.government.ru/media/acts/files/0001201605250013.pdf.

48 Rostec press release, "VEB i Rostekh obiavliaiut o zapuske raboty «Konversiia»" [VEB and Rostec announce the launch of NPO 'Konversiya"s work], 10 July 2017, https://rostec.ru/media/pressrelease/4520648/#start.

49 According to SIPRI's database of the world's top 100 arms-producing and military-services companies in 2024, four of the top ten companies derive at least 40 per cent of their revenues from civilian markets: https://www.sipri.org/visualizations/2025/sipri-top-100-arms-producing-and-military-services-companies-world-2024.

50 Krome, "State Corporate Governance," p. 1365.

51 Inna Sidorkova and Kirill Sirotkin, "Sergei Chemezov—RBK: «Zakryt polnostiu stranu tekhnicheski nevozmozhno» [Sergei Chemezov to RBC: "It is technically impossible to close the country completely"]," *RBC*, 16 September 2019, https://www.rbc.ru/interview/politics/16/09/2019/5d78cfca9a7947a694099758.

stake in Kalashnikov Concern[52] to private investors, and in 2018 it sold 75 per cent minus one share of Technodinamika (keeping for itself a 25 per cent plus one share, also known as a "blocking share").[53]

At the same time, Rostec has not always succeeded in restoring profitability to struggling companies. In the case of AvtoVAZ, Russia's leading car manufacturer, the company remained loss-making even after ten years of Rostec ownership.[54] In addition, as mentioned in Chapter 2, Rostec's diversification also serves as a source of rents through corrupt privatisation processes. It is worth noting here that Rostec's acquisitions are subject to approval by the corporation's supervisory board and, in some cases, the Russian president. Consequently, Chemezov's informal networks have been vital for securing political backing for expansion. One telling case is that of National Ecological Operator (NEO), a waste-processing subsidiary established by Rostec in 2012. The company, managed by Vitalii Mashchitskii, Chemezov's childhood friend and chairman of Rostec subsidiary Nacimbio, was loss-making during the first two years of its existence, with the salaries of four employees accounting for nearly 70 per cent of all expenses.

In 2014, NEO's management decided to sell the company to a private buyer, Hermes, which bought 75 per cent of its shares for one rouble apiece, totalling 300,000 roubles. A journalistic investigation subsequently found that 25 per cent of Hermes was owned by Tatyana Skorik, the wife of Mashchitskii's Vy Holding CEO, Oleg Skorik. Following the sale, the company's revenues increased markedly, reportedly facilitated by Chemezov's lobbying of Putin to transfer the Ministry of Defence's (MOD) decommissioned equipment to the enterprise for recycling. In short, the company's management had effectively sold the enterprise to associates at

52 Forbes Russia, "«Rostekh» prodast 49% «Kalashnikova» chastnym investoram" [Rostec will sell 49% of Kalashnikov to private investors], *Forbes Russia,* 23 September 2013, https://www.forbes.ru/news/245077-rostekh-prodast-49-kalashnikova-chastnym-investoram.

53 Kommersant, "«Rostekh» prodal 75% «Tekhnodinamiki» vladeltsu «NK Banka»" [Rostec sold 75% of Technodinamika to the owners of 'NK Bank'], *Kommersant*, 14 December 2018, https://www.kommersant.ru/doc/3829351. Technodinamika is a holding company in Rostec's aviation cluster and produces various components for aviation systems and weapons.

54 Vladimir Voronov, "Druzia Putina: Sergei Chemezov i ego «Rospylesos»" [Putin's Friends: Sergei Chemezov and his "Rospylesos"], *Krym.Realii*, 10 May 2016, https://ru.krymr.com/a/27725404.html.

Table 3 Rostec civilian production 2014–2024.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Civilian production (RUB, billions)	270,1	336,0	374,0	548,0	497,7	600,6	640,0	939,0	942,0	993,0	1108,0
Civilian production as share of total revenue (%)	28,0	26,0	25,1	28,8	30,3	31,1	33,9	45,5	44,5	35,0	30,7

Source: Rostec Annual Reports for the years 2014–2021, and Chemezov's presentations of Rostec's annual results to Putin 2022–2024.

below-market prices, subsidised at Rostec's expense, with Chemezov's knowledge.[55] These examples highlight that Rostec's expansion and diversification, enabled by Chemezov's informal networks, have not only served to compensate for falling defence orders and exports, but also provide entry points for new sources of rents.

3.2 The Profit Model: Monopoly and Privileged Access to State Resources

Rostec's expansion into the civilian sector is not only a hedging strategy against an eventual decline in state defence orders or exports, but also a means of gaining access to additional government contracts. In 2015, for instance, the Russian government made Rostec subsidiary Nacimbio the sole supplier of immunological drugs for the National Calendar of Preventive Vaccinations until 2017. This monopoly was subsequently extended several times for 2018–2019, 2020–2021, 2022–2023, and 2024–2026.[56] Chemezov has also sought to expand Nacimbio's remit further and personally appealed to Putin to receive a monopoly in tuberculosis and HIV medicines, a request that was granted.[57] In this context, Rostec has also benefited from state policy requiring government entities and state-owned companies to procure civilian products from the defence industry.[58] Putin has publicly justified such policy with reference to the need for increasing the defence sector's civilian production, as well as advancing Russia's import-substitution efforts.[59]

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55 Selivanova, "Rostec head's trusted people."

56 Aleksandra Alkhovskaya, "Natsimbio naznachili edinstvennym postavshchikom vaktsyn na 2024–2025 gody" [Nacimbio was designated sole supplier of vaccines 2024-2025], *Vademec*, 1 March 2024, https://vademec.ru/news/2024/03/01/natsimbio-naznachili-edinstvennym-postavshchikom-vaktsin-na-2024-2025-gody-/.

57 Svetlana Reyter, Dmitri Koptyubenko, and Mikhaila Rubina, "Chemezov poprosil u Putina monopoliiu na postavki lekarstv ot VICh" [Chemezov asked Putin for a monopoly on supplies of HIV medicines], *RBC*, 22 July 2015, https://www.rbc.ru/business/22/07/2015/55af9f0c9a794710de492075.

58 Luzin, "Russia's Defense Industry and Its Influence on Policy."

59 TASS, "Putin rasskazal o planakh narastit doliu grazhdanskoi produktsii v OPK do 50% k 2030 godu" [Putin spoke about plans to increase the share of civilian products in the defence industry to 50% by 2030], *TASS*, 24 January 2018, https://tass.ru/armiya-i-opk/4899582.

By entering strategic sectors of the Russian economy, Rostec has also successfully gained access to various state-backed financial flows. The conglomerate has, for instance, received billions of roubles via state support programmes (*gosudarstvennye programmy,* or *gosprogrammy*) and federal target programmes (*federalnye tselevye programmy*) including those for the defence industry and import substitution. The state programme "Development of the defence-industrial complex" for 2016–2020 allocated over RUB 37 billion with the target to increase output by 1.5 times and worker productivity by 1.9 times, as well as support for ramping up civilian production.[60] Recipients are not listed, but Rostec mentions its participation in its annual reports.[61] In addition to the above programme, the corporation also receives funding from state programmes for:

- Development of the aviation industry for 2013–2015
- Development of the electronic and radio-electronic industry for 2013–2025
- Development of industry and increasing its competitiveness
- Federal space programme
- Support, development and utilisation of GLONASS systems for 2012–2020, and
- A set of measures for restructuring industrial facilities used in the production of ammunition.[62]

Rostec also participated in the national development goals set by Putin in his fourth inaugural address as president (May 2018), implemented through 12 national projects (*natsional'nye proekty*) and further divided into 72 federal programmes.[63] While precise allocations for the conglomerate's enterprises are unavailable, by Rostec's own account, it participated in all 12 projects of the RUB 25.7 trillion programme from 2018 to 2024. Indeed, Putin stated that the participation of state corporations in development projects is mandatory, and that "it is for such purposes that they were ultimately created." [64] Rostec has also received financial support for, among other things, aerospace navigation equipment[65] from Russia's Industrial Development Fund (*Fond razvitiya promyshlennosti*), a VEB fund that provides preferential financing for a variety of projects, including "high-tech civilian or dual-use products by defence

60 Government of the Russian Federation, Resolution no. 425-8.
61 Rostec, 2017 Annual Report, p. 205.
62 Rostec, 2018 Annual Report, p. 161; and Rostec 2021 Annual Report, p. 167.
63 Not to be confused with federal *target* programmes.
64 Rostec press release, "Rostekh vystupaiet odnim iz osnovnykh ispolnitelei 12 natsproektov" [Rostec is one of the main executors in 12 national projects], 6 June 2019, https://rostec.ru/media/news/rostekh-vystupaet-odnim-iz-osnovnykh-ispolniteley-12-natsproektov/#start.
65 Rostec press release, "Struktury Rostekha pri podderzhke FRP nachnut vypusk novogo aeronavigatsionnogo oborudovaniia" [Rostec structures with the support of the IDF will start producing new aerospace navigation equipment], 23 August 2021, https://rostec.ru/media/news/struktury-rostekha-pri-podderzhke-frp-nachnut-vypusk-novogo-aeronavigatsionnogo-oborudovaniya/.

industry enterprises."[66] While it is not unusual for states to establish development banks or funds to subsidise strategic industries, Russia's efforts in this area are likely influenced by rent-seeking considerations, and it is unclear to what extent they are implemented with performance and efficiency criteria.

This highlights that, ultimately, Rostec and Russia's defence enterprises do not operate like civilian companies in a market system, and their official revenue figures cannot be taken at face value as a marker of qualitative growth. Chemezov often highlights the corporation's consistent revenue growth and asset sales as an indicator of its effective management, yet according to Nicole Krome, continuous expansion "makes external control nearly impossible," and "ensures that the turnover figures increase and, at the same time, gives access to additional government contracts and lines of credit. In other words: growth and even productivity increases can be put on the balance sheet for which no actual restructuring or modernisation measures exist."[67]

In sum, rather than growing through modernisation, the corporation has drawn on its unique role in Russia's political system, Chemezov's informal networks, and its importance for the political leadership's foreign policy to secure political backing for expansion into new markets for government contracts and state funding.

[66] Industrial Development Fund website, https://web.archive.org/web/20220124192735/https:/frprf.ru/o-fonde/ (archived link).
[67] Krome, "State Corporate Governance," p. 1365.

4 Rostec's Growing Pains

Russia's invasion of Ukraine in 2022 and the war's immense materiel needs have substantially reshaped the Russian defence industry's operating conditions, not least as a consequence of industrial mobilisation and tougher sanctions. This chapter focuses on developments since February 2022 and asks how the war has changed the political and economic conditions in which Rostec operates. Rather than attempting to reconstruct precise output figures, it focuses on some of the structural challenges Rostec faces in increasing output.

In many respects, Russia's war on Ukraine has been a boon for Rostec, which has continued to grow and expand since 2022. In real terms, the corporation's official revenues have grown by roughly a third from 2021 to 2024 (see Table 1). The conglomerate has also continued its expansion, riding on a wave of state enterprise reorganisations, expropriations, and renationalisations.[68] In December 2022, for instance, the Russian government announced the corporatisation of 12 state ammunition and special chemistry[69] enterprises and their transfer to Rostec ownership.[70] More recently, in September 2024, Rostec received a 63.4 per cent stake in the Klimovsky Specialised Cartridge Plant (KSPZ) after an accident at the plant's boiler house triggered a criminal investigation into the alleged theft of KSPZ shares by the enterprise's private owners, culminating in confiscation by the state.[71] At the same time, Rostec claims to have increased defence production several times over, and according to Chemezov, the corporation now accounts for over half of the GOZ's value and 80 per cent of the Russian equipment used in Russia's war against Ukraine.[72]

Yet the war has not been without challenges for Russia's defence industry. Among other things, Chemezov has complained that Rostec's defence enterprises are unprofitable and lack incentives to continue expanding output. While such statements may in part reflect routine lobbying for additional resources, they are also consistent

[68] For a more detailed overview of the Kremlin's renationalisations and expropriations, see Denis Morokhin, "Voennoe pogloshchenie" [Military absorption], *Novaya Gazeta Europe*, 25 March 2025, https://novayagazeta.eu/articles/2025/03/25/voennoe-pogloshchenie.

[69] In Russia, "special chemistry" refers to explosives, rocket fuel, and other chemicals that often have military end-uses. See Jack Watling and Oleksandr V. Danylyuk, "Winning the Industrial War: Comparing Russia, Europe and Ukraine, 2022-24," *RUSI Occasional Papers* (3 April 2025), p. 24, https://www.rusi.org/explore-our-research/publications/occasional-papers/winning-industrial-war-comparing-russia-europe-and-ukraine-2022-24.

[70] Presidential decree On the property contribution of the Russian Federation to the State Corporation for the Promotion of the Development, Production and Export of High-Tech Industrial Products "Rostec," no. 987, 30 December 2022.

[71] Anastasia Korochkina, "Putin podpisal ukaz o peredache Klimovskogo patronnogo zavoda «Rostekhu»" [Putin signed a decree on the transfer of Klimovsky cartridge plant to "Rostec"], *Forbes*, 30 September 2024, https://www.forbes.ru/biznes/522242-putin-podpisal-ukaz-o-peredace-klimovskogo-patronnogo-zavoda-rostehu.

[72] Vesti, "Chemezov: u Rostekha idet vzaimnyi obmen informatsiei z boitsami SVO" [Chemezov: Rostec has a mutual exchange of information with SVO fighters], *Vesti*, 17 February 2025, https://www.vesti.ru/article/4363562; and Petr Kanaev and Irina Parfenteva, "Chemezov – RBK: «Ekonomika dlia voennykh – delo desiatoe»" [Chemezov to RBC: "Economics is a secondary concern for the military"], *RBC,* 17 May 2024, https://www.rbc.ru/interview/economics/17/05/2024/664215389a7947dc93772782.

with the Russian defence industry's persistent debt problems and history of state bailouts.[73] Moreover, the growing presence of older Soviet equipment on the battlefield suggests that Russian industry is struggling to keep pace with attrition in Ukraine.[74] Also worth noting, though not examined here in detail, are the ongoing Russian debates about the armed forces' future force structure.[75] As the main producer of major weapons platforms, such as tanks and helicopters, that have proven vulnerable in Ukraine, Rostec and its management stand to lose from a shift of state resources to, for instance, unmanned systems produced by emerging companies.[76] Taken together, these developments point to a tension between Rostec's apparent wartime expansion and the constraints on production capacity that the war has spawned and cast light on, a tension that forms the central focus of this chapter.

4.1 The Twin Challenges of Labour and Inflation

One of the most direct ways in which Rostec has ramped up output has been by increasing work hours for existing workers to take advantage of idle production capacity. According to Chemezov, UVZ, TsNIITochMash, Kalashnikov, High-Precision Complexes, and OAK are working in three or four shifts in order to meet the state defence order.[77] Other Rostec enterprises producing vital equipment for Russia's battlefield needs in Ukraine have almost certainly taken similar measures. Increasing work hours does not, however, bring with it a proportionate increase in output as worker productivity falls due to exhaustion; in some cases, it might also not be enough to fully exploit spare capacity.

[73] Luzin, "Russia's Defense Industry and its Influence on Policy"; and Craig Kennedy, "Russia's Hidden War Debt (full report)," *Navigating Russia* (Substack), 14 February 2025, https://navigatingrussia.substack.com/p/russias-hidden-war-debt-full-report?r=1c66ih.

[74] Australian YouTuber and defence economics commentator Perun uses visually confirmed loss data from various sources to show the growing presence of Soviet-era equipment in *inter alia* Russia's main battle tank losses. See Perun, "Russian Equipment Losses & Reserves (2024)—The Changing Russian Force in Ukraine," posted 14 July 2024, by *Perun*, YouTube, 00:03:45–00:13:48, https://www.youtube.com/watch?v=xF-S4ktINDU.

[75] See for instance Ruslan Pukhov, "Vremia gvardeiskikh tankovykh divizii bezvozvratno ushlo" [The time of the Guards tank divisions is irrevocably gone], *Kommersant*, 28 January 2026, https://www.kommersant.ru/doc/8380069; and Iurii Baluevskii and Ruslan Pukhov, "«Tsyfrovaia voina» – novaia realnost" ["Digital War" – a new reality], *Russia in Global Politics*, no. 6 (November/December 2025), pp. 60-68, https://globalaffairs.ru/articles/czifrovaya-vojna-baluevskij-puhov/.

[76] For discussions on "the people's defence-industrial complex" (NVPK in Russian), see Roman Kretsul, "«Narodnyi VPK» za 2024 god vyros v nastoiashchuiu silu" ["The People's Military-Industrial Complex" in 2024 has grown into a real force], *Vzgliad*, 27 December 2024, https://vz.ru/society/2024/12/27/1305141.html; and Center for Strategic & International Studies (CSIS), "The Russia-Ukraine Drone War: Innovation on the Frontlines and Beyond," *CSIS*, 28 May 2025, https://www.csis.org/analysis/russia-ukraine-drone-war-innovation-frontlines-and-beyond.

[77] Sergei Chemezov, "Promyshlennyi karkas strany: Sergei Chemezov – o rezultatakh raboty Rostekha za 15 let" [Industrial framework of the country: Sergei Chemezov—On the results of Rostec's work over 15 years], *TASS*, 22 November 2022, https://tass.ru/armiya-i-opk/16397293.

Table 4 Rostec employee headcount, average nominal salary (Rostec and Russia as a whole), and output per employee.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Employee headcount (thousands)	443,4	445,0	453,0	511,7	529,3	590,6	589,2	591,2	592,0	>660.0	~700.0
Change compared to previous year (%)	*-11,3*	*1,0*	*2,0*	*13,0*	*3,4*	*11,6*	*-0,2*	*0,3*	*0,1*	*11,5*	*6,1*
Average nominal salary (per month RUB, thousands)	37,1	41,0	44,0	46,7	49,5	54,4	55,6	61,6	72,2	88,3	107,0
Change compared to previous year (%)	*19,7*	*11,0*	*7,0*	*6,4*	*5,9*	*9,9*	*2,2*	*10,8*	*17,2*	*22,0*	*21,2*
Average nominal salary of employees in the Russian economy as a whole (per month RUB, thousands)	*32,5*	*34,0*	*36,7*	*39,2*	*43,7*	*47,9*	*51,3*	*57,2*	*65,3*	*74,9*	*89,1*
Output per employee (RUB, thousands)	2 176,0	2 564,0	2 793,0	3 106,0	3 103,0	3 000,0	3 187,0	3 491,0	3 578,30	4 303,0	5157,1
Change compared to previous year (%)	*NA*	*17,0*	*9,0*	*11,2*	*-0,1*	*-3,3*	*6,2*	*9,5*	*2,5*	*20,3*	*19,8*

Notes: Output per employee in 2023 and 2024 was calculated by the author and is based on revenue and headcount estimates. Rosstat statistics on salaries include the illegally annexed Ukrainian territories of Crimea and Sevastopol from 2015.
Source: Rostec Annual Reports for the years 2014–2021, Chemezov's presentations of Rostec's annual results to Putin 2022–2024, and Rosstat: https://rosstat.gov.ru/labor_market_employment_salaries.

Consequently, Rostec has recruited more workers to meet wartime demand. Since the start of the war, the conglomerate reportedly hired roughly 110,000 new workers (a figure which rose to over 700,000 in 2024, from 591,000 in 2021). Additionally, according to statements by Deputy Prime Minister Manturov, the Russian defence industry as a whole hired over 520,000 new workers in the year and a half preceding June 2024.[78] Rostec has attracted new workers in large part by raising salaries, which have grown from an average of RUB 61,600 per month in 2021 to RUB 107,000 per month in 2024, an increase of nearly 74 per cent. By comparison, the average nominal salary of employees in Russia as a whole increased from RUB 57,100 to RUB 89,100 (or 56 per cent) from 2021 to 2024 (see Table 4).

This has not been enough, however. In June 2022, then deputy prime minister Yuri Borisov stated that there was a deficit of 400 000 workers and engineers (of which 120,000 engineers) in the defence industry. By June 2024, Manturov had revised this figure down to 160,000 workers and engineers. The 400,000-figure surfaced again in a November 2024 statement by the head of the State Duma Committee on Control,

78 Yulia Ovchinnikova, "Manturov rasskazal, skolko sotrudnikov ne khvataet oboronnym predpriiatiiam" [Manturov said how many employees defence enterprises lack], *RBC*, 7 June 2024, https://www.rbc.ru/economics/07/06/2024/6662c05f9a7947b6bcad6605; TASS, "Chislo sotrudnikov predpriiatii Rostekha mozhet dostich 850 tys. chelovek k 2028 godu" [Number of Rostec employees may reach 850 thousand by 2028], *TASS,* 23 November 2024, https://tass.ru/ekonomika/22479181.

Oleg Morozov.[79] In his June 2025 annual report to Putin on Rostec's development, Chemezov highlighted that the corporation needed to hire an additional 130,000 workers by 2028.[80] Although the clutter of numbers is perhaps intentionally confusing, labour shortages are nonetheless a recurring theme, both in reports about the defence industry and the Russian economy more broadly.[81]

In a tight labour market where Rostec competes with both the civilian economy and the armed forces, the corporation will need to continue raising salaries to attract workers, which will aggravate inflation. Although a high central bank policy rate has mitigated this trend somewhat, high interest rates have also made it harder for Russian companies to take on new loans and invest in future growth. Meanwhile, inflation continues to rise and remains a risk. A key development to monitor will therefore be the Russian government's restrictions on labour rights and mobilisation of low-paid students, convicts, or foreign workers as a stopgap.[82] A number of reports emanating from Japanese media,[83] as well as Ukrainian[84] and South Korean[85] intelligence, suggest that thousands of North Koreans have already been sent to Russia as a cheap labour force for both civilian and defence projects.

4.2 Productivity Constraints: Sanctions and Import Substitution

Barring a more permissive labour market, Rostec's ability to continue ramping up output will depend on the adoption of more efficient processes and investment in modern industrial production technologies. This is especially relevant in areas where current capacity has been fully engaged or with limited pre-war capacity. Rostec's investments have, in fact, increased markedly from RUB 242.1 billion in 2021 to RUB 676 billion in 2024, though little is known about the content of these investments. Rostec's output per employee has also reportedly risen throughout the 2010s (see Table 4) and into the war, but this data should not be interpreted as an indicator of productivity. Longer working hours since 2022 might yield greater output per employee in a given year without increasing the efficiency of underlying work

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79 Pavel Luzin, "Russia's Year of Truth: The Missing Military Hardware," *Europe's Edge*, 22 January 2025, https://cepa.org/article/russias-year-of-truth-the-missing-military-hardware/.

80 Kremlin, "Meeting with 'Rostec' head Sergei Chemezov," 17 June 2025.

81 Luzin, "Russia's Year of Truth"; and Ilan Berman, "Russia Faces A Future Labor Shortage, Which War Makes More Complex," *Forbes*, 12 August 2025, https://www.forbes.com/sites/ilanberman/2025/08/12/russia-faces-a-future-labor-shortage-which-war-makes-more-complex/.

82 Watling and Danylyuk, "Winning the Industrial War," pp. 9, 15–16.

83 Tim Zadorozhnyy, "North Korea considers sending 25,000 workers to Russia to help produce Shahed drones, media reports," *Kyiv Independent*, 19 June 2025, https://kyivindependent.com/north-korea-may-send-25-000-workers-to-russia-to-help-produce-shahed-drones-media-reports/.

84 The New Voice of Ukraine, "Russia enlists North Korean labor to assemble drones," *The New Voice of Ukraine*, 1 October 2025, https://english.nv.ua/russian-war/russia-enlists-north-korean-labor-to-assemble-drones-50549380.html.

85 Jean Mackenzie, "North Koreans tell BBC they are being sent to work 'like slaves' in Russia," *BBC*, 12 August 2025, https://www.bbc.com/news/articles/c2077gwjlvxo.

processes. Moreover, the value of defence contracts in the GOZ is derived from the cost of inputs plus a fixed profit rate. As a result, higher output (revenue) per employee may simply reflect higher costs and salaries rather than greater efficiency. In other words, rising output per worker may paradoxically signal growing inefficiency rather than productivity gains, and is therefore not an appropriate measure of productivity.[86] Chemezov himself complained in 2024 that the MOD offsets industry cost savings by adjusting subsequent annual contract values downwards, leaving enterprises with little incentive to keep costs in check.[87]

Rostec's diversification into civilian markets offers a useful illustration of issues related to not only productivity, but also access to components. Although Chemezov and defence officials have openly stated that diversification and conversion have taken a back seat in light of the priority given to military production, certain civilian products are considered essential even in wartime.[88] One such example is civilian aviation, which is crucial for tying together Russia's vast geography.[89] In order to replace ageing Western aircraft, the Russian government announced an ambitious plan in June 2022 calling for the production of 1,036 civilian aeroplanes containing only Russian parts by 2030.[90] The target was later revised to 994 aircraft.[91] Under the plan, airlines were supposed to receive 40 aircraft of various models from Rostec's OAK in 2022 and 2023: only five were ever delivered.[92]

Sanctions and import substitution have been major stumbling blocks in this context, causing successive delays and cost overruns in OAK's civilian passenger jet programmes. According to its 2024 Annual Report, OAK exploited 82 per cent of its production capacity in 2024, and was unable to make full use of remaining capacity due to a lack of materials and imported components.[93] Russian narrow-body, medium-haul jets such as the MC-21 and SJ-100 were filled with Western components that Russia lost access to after 2022. Reportedly, OAK needs to replace 40 foreign-made components in the SJ-100, which only completed its first test flight using the

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86 Denis Popkov, Vladimir Kotsyubinskiy, and Svetlana Kotsyubinskaya, "Pirrova pobeda gosoboronzakaza: problem effektivnosti predpriiatii OPK ignorirovat bolshe nelzia" [The state defence order's Pyrrhic victory: the problem of the efficiency of defence industry enterprises can no longer be ignored], *Novosti VPK*, 15 September 2017, https://vpk.name/news/192287_pirrova_pobeda_gosoboronzakaza_problemu_effektivnosti_predpriyatii_opk_ignorirovat_bolshe_nelzya.html.

87 Kanaev and Parfenteva, "Chemezov to RBC."

88 The share of civilian production in Rostec's revenues has fallen from 45.5 per cent in 2021 to 30.7 per cent in 2024 (see Table 3).

89 Other priority areas mentioned by Chemezov include helicopters and turbines for energy generation. See Kanaev and Parfenteva, "Chemezov to RBC."

90 The Moscow Times, "Russia Needs to Replace Hundreds of Foreign-Made Planes by 2030, Rostec Chief Warns," 19 March 2025, https://www.themoscowtimes.com/2025/03/19/russia-needs-to-replace-hundreds-of-foreign-made-planes-by-2030-rostec-chief-warns-a88422.

91 Interfax, "Russia needs to coordinate aircraft production with airlines' plans and capabilities—Rostec CEO," 12 November 2024, https://interfax.com/newsroom/top-stories/107637/; RuAviation, "Rostec will receive a loan for the production of civilian airplanes," *RuAviation*, 16 January 2024, https://ruavia.su/rostec-will-receive-a-loan-for-the-production-of-civilian-airplanes/.

92 The Moscow Times, "Russia Needs to Replace."

93 Public Joint Stock Company "United Aircraft Corporation" (PJSC "UAC") 2024 Annual Report (2025), pp. 14–15, https://www.e-disclosure.ru/portal/files.aspx?id=11433&type=2.

domestically produced PD-8 engine in March 2025.[94] As for the MC-21, its domestically produced PD-14 engine received certification in late 2022, but 36 imported systems still needed replacement as of 2024. Consequently, deliveries that were supposed to begin in 2023–24 have been postponed to 2025–26.[95] Other sectors, such as electronics, pharmaceutical drugs, and automobiles have reportedly faced similar issues.[96] In the automotive sector, Rostec's share in the domestic market has fallen since the start of the war, prompting Chemezov to call for state-imposed limits on imports of Chinese cars.[97]

In the defence sector, Russia produces virtually all of its major weapon systems domestically. Yet certain key inputs, which cannot be produced in sufficient quantity or quality domestically, must be imported from abroad. Machine tools and integrated circuits have been identified as critical bottlenecks in this regard, and the introduction of far-reaching sanctions following Russia's full-scale invasion of Ukraine in 2022 has therefore represented a crucial barrier to defence-industrial production.[98] These sanctions have not prevented Russia from meeting at least some of its critical-input needs. Russia has, for instance, circumvented sanctions by concealing end uses and purchasing items through intermediaries in third countries (known as "parallel imports"), as well as by simply cannibalising parts from non-restricted civilian goods.[99] Indeed, Western components produced after 2022 have been found in Russian-made[100] (and North Korean-made[101]) drones and missiles, and the scale of Russian attacks on Ukraine with Shahed/Geran one-way attack drones and ballistic missiles has increased over time.[102] Meanwhile, Russia has reportedly acquired over 22,000 CNC (computer numerical control) machine tools, critical inputs for the

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94 The Moscow Times, "Russia's Superjet Airliner Completes First Test Flight With Domestic Engine," *The Moscow Times*, 17 March 2025, https://www.themoscowtimes.com/2025/03/17/russias-superjet-airliner-completes-first-test-flight-with-domestic-engine-a88385.

95 Russian Aviation Insider, "Russia admits challenges with import phaseout in commercial airplane manufacturing," *Russian Aviation Insider,* 10 March 2024, https://www.rusaviainsider.com/russia-admits-challenges-with-import-phaseout-in-commercial-airplane-manufacturing/.

96 Denis Morokhin, "Strana bez iskhodnikov" [Country without sources], *Novaya Gazeta Yevropa*, 8 August 2024, https://novayagazeta.eu/articles/2024/08/08/strana-bez-iskhodnikov.

97 Kanaev and Parfenteva, "Chemezov to RBC."

98 Dmitry Gorenburg et al., *Crafting the Russian War Economy: The Effects of Export Controls on Russia's Defense Industrial Production*, *Center for Naval Analyses* (October 2024), pp. 35, 44, https://www.cna.org/reports/2024/10/Crafting-the-Russian-War-Economy.pdf.

99 James Byrne, Denys Karlovskyi and Gary Somerville, "In Plain Sight: Operations of a Russian Microelectronics Dynasty," *RUSI,* 14 December 2023, https://www.rusi.org/explore-our-research/publications/commentary/report-plain-sight-operations-russian-microelectronics-dynasty; and Gorenburg et al., *Crafting the Russian War Economy,* pp. 3, 28–32.

100 Conflict Armament Research, "Evidencing commercial components in missiles and UAVs: Ukraine Field Dispatch, July 2025," *Conflict Armament Research* (July 2025), https://storymaps.arcgis.com/stories/288b05993eb041c289fb3749b4e1d4cf. See also James Byrne at al., "Silicon Lifeline: Western Electronics at the Heart of Russia's War Machine," *RUSI* (August 2022), https://static.rusi.org/RUSI-Silicon-Lifeline-final-updated-web_1.pdf.

101 Conflict Armament Research, "North Korean missile relies on recent electronic components: Ukraine Field Dispatch, February 2024," *Conflict Armament Research* (February 2024), https://storymaps.arcgis.com/stories/0814c6868bbd45a98b15693a31bd0e7f.

102 Institute for the Study of War, "Russian Drone and Missile Strikes On Ukraine, January 1, 2025 To September 28, 2025," *Institute for the Study of War*, 28 September 2025, https://understandingwar.org/research/russia-ukraine/russian-drone-and-missile-strikes-on-ukraine-january-1-2025-to-september-28-2025-2/; compare with scale of strikes in 2024: Institute for the Study of War, "Special Report: Russian Strikes More Effective As Ukraine Exhausts Defenses," *Institute for the Study of War*, 12 April 2024, https://understandingwar.org/research/russia-ukraine/special-report-russian-strikes-more/.

defence industry, between January 2023 and July 2024. While most of these machines originated in Asia, Western firms played a much greater role in the supply of CNC components needed to maintain existing equipment, with Switzerland alone accounting for over 20 per cent of supplied components.[103] Consequently, Rostec's investments and import substitution efforts, continued ability to circumvent sanctions, and alternative supplies, especially from China,[104]will be decisive for their ability to continue ramping up production and requires further study.

While sanctions have not stopped Russia from continuing to wage its war, they have likely forced defence enterprises, including those of Rostec, to expend more resources on devising schemes for circumventing sanctions, not to mention import substitution and salary increases. Additional funds will therefore be needed to pay for growing costs.[105] Rostec's ability to absorb these is limited, however, by its falling profit margins, which have dropped from a pre-war average of 6.2 per cent (and a peak of 10.1 per cent in 2019) to around 2 per cent in 2023 and 3.6 per cent in 2024 (see Table 1 in Chapter 3 for more detail). In a context where the Russian Central Bank's policy rate has soared as high as 21 per cent (October 2024 to June 2025) to combat inflation, such profit margins do not allow defence enterprises to repay commercial loans without going further into debt and they make it harder to secure new loans. As explained below, defence firms are therefore dependent on government-funded concessional loans with low interest rates. In addition, Rostec uses its civilian holdings to cross-subsidise its defence enterprises. Consequently, Rostec's overall profit figures do not necessarily reveal the true state of affairs in the corporation's defence enterprises. Indeed, in 2023, Chemezov said "at best, [defence enterprises] are working at zero, if not at a loss."[106]

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103 Oleksandr Moiseienko, "The Billion-Dollar Supply Chain Behind Russia's Weapons-Making Machines: Who's Selling?" *United24Media*, 23 January 2025, https://united24media.com/war-in-ukraine/the-billion-dollar-supply-chain-behind-russias-weapons-making-machines-whos-selling-5217. For more information on Russia's machine-tool industry, see Tomas Malmlöf, *Russian machine tool industry—Prospects for a turnaround? FOI-R--4635--SE* (1 March 2019), https://www.foi.se/rapportsammanfattning?reportNo=FOI-R--4635--SE.

104 Veronika Melkozerova, "China helps Russia pull ahead in lethal drone war race with Ukraine," *Politico*, 5 June 2025, https://www.politico.eu/article/china-russia-lethal-drone-war-race-ukraine-war-invasion-manufacture-putin-tech/.

105 Pavel Luzin, "Rostec's Updated 2023 Financial Data Shows Decline in Revenue," *Eurasia Daily Monitor*, vol. 21, no. 117 (August 1, 2024), https://sites.tufts.edu/fletcherrussia/rostecs-updated-2023-financial-data-shows-decline-in-revenue/.

106 Kanaev and Parfenteva, "Chemezov to RBC."

4.3 Rostec's Retreat from Global Markets

The war has also cost Rostec (and the Russian defence industry more broadly) a significant portion of its export revenues. Although official export data from Rostec or government sources are limited, SIPRI estimates indicate that Russian arms exports have fallen from roughly 2.5 billion trend-indicator values (TIV) in 2022 to TIV 1.3 billion in 2024 (see Figure 2 below for a comparison of Russia pre-war and wartime exports).[107] As Russia's principal manufacturer of military aircraft, armoured vehicles, and engines (produced by OAK, UVZ, and United Engine Corporation, respectively), Rostec accounts for the lion's share of these exports. While the negative trend in exports predates Russia's full-scale invasion and the decrease since 2022 has been smaller in absolute terms, this more recent downturn nonetheless represents a halving of Russia's arms exports (see Figure 2). In broader terms, Russia's arms exports 2020–2024 have fallen by 64 per cent since 2015–2019.[108] One possible cause of this downturn is the reorientation of the Russian defence industry towards the state's wartime needs. Russia has reportedly delayed or cancelled contracts with customers such as Vietnam, and according to analysis of customs data, it has even bought back military equipment, such as optics for tanks

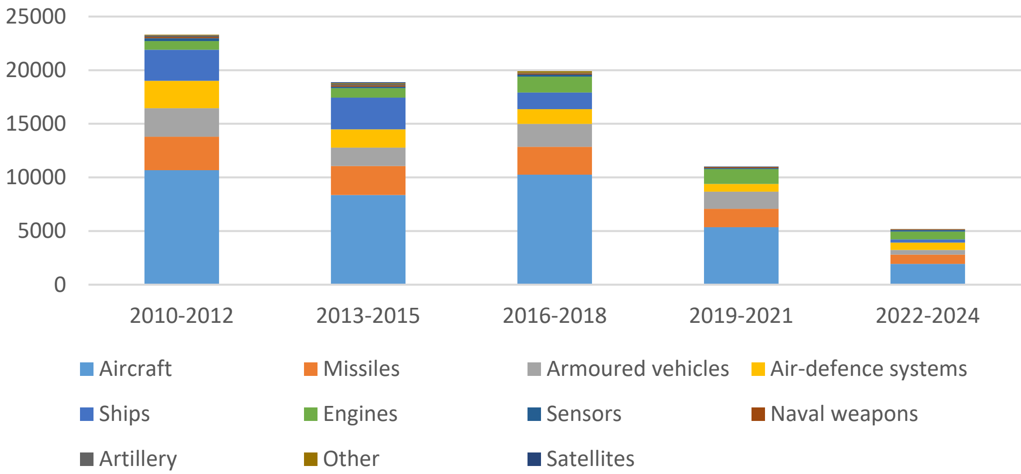

Figure 2: Russian arms export deliveries by weapon category measured in millions of SIPRI trend-indicator values (TIV) over three-year periods.
Source: SIPRI Arms Transfers Database, *https://doi.org/10.55163/SAFC1241*.

[107] SIPRI's TIV "is based on the known unit production costs of a core set of weapons and is intended to represent the transfer of military resources rather than the financial value of the transfer," and to thereby enable comparison between countries over time. For more on SIPRI's sources and methods, see https://www.sipri.org/databases/armstransfers/sources-and-methods.
[108] Mathew George et al., "Trends in International Arms Transfers, 2024," *SIPRI Fact Sheet* (March 2025), p. 5, https://www.sipri.org/sites/default/files/2025-03/fs_2503_at_2024_0.pdf.

and missiles, previously sold to Myanmar or India.[109] The war has also impacted exports by laying bare flaws in Russian weapons design (referred to in another report as "negative demonstration effects"). Examples include Russian main battle tanks and other armoured vehicles, which have proven to be vulnerable to modern anti-tank weapons, or air-defence systems that have been destroyed in air strikes. Such failures may well be the result of other issues such as poor training of personnel or integration with other systems, but they nonetheless promote the view that Russian materiel is ineffective or obsolete.[110]

Rostec's Rosoboronexport claims that its export order book has remained steady, in spite of the war, at roughly USD 60 billion. Yet, according to SIPRI data, the aforementioned decline in weapons deliveries has also been accompanied by a reduction in new orders, which indicates falling demand and reflects several overlapping trends (see Figure 3). Perhaps the most obvious factor is the supply risk that potential buyers face when purchasing arms that may end up being diverted to the war. In addition to this, demand for Russian arms has been concentrated in a small handful of large buyers. According to SIPRI, over half of Russia's arms exports in 2020–2024 went to India (38 per cent) and China (17 per cent), both of

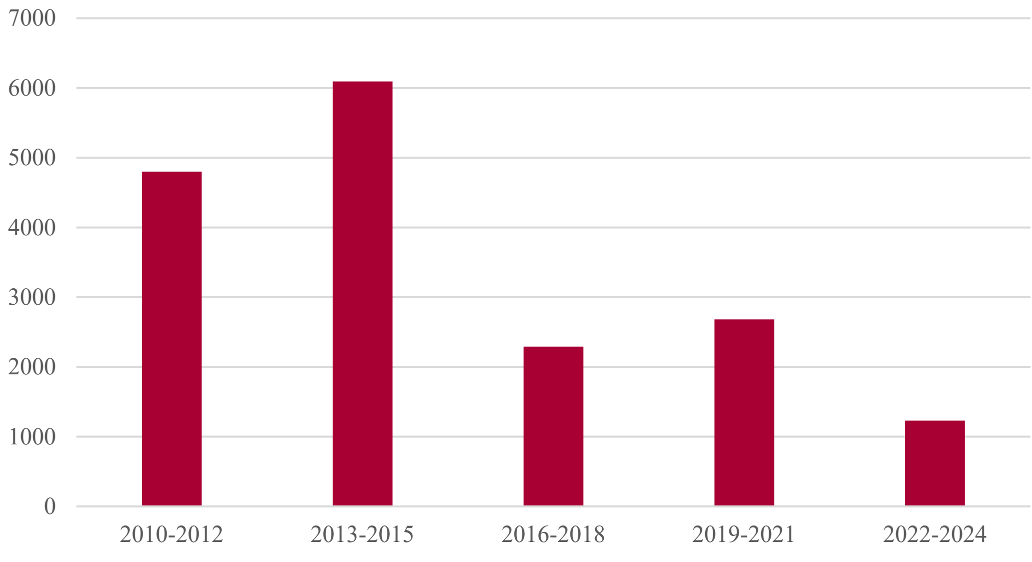

Figure 3. Russian arms export orders, yearly average over three-year periods, measured in millions of SIPRI trend-indicator values (TIV).
Source: SIPRI Arms Transfers Database, https://doi.org/10.55163/SAFC1241.

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109 Max Bergmann et al., "Seller's Remorse: The Challenges Facing Russia's Arms Exports," *CSIS* (September 2023), pp. 8–9 https://csis-website-prod.s3.amazonaws.com/s3fs-public/2023-09/230918_Bergmann_Seller%27s_Remorse.pdf?VersionId=NVJUTh98MUcdL6omB.5ZM03zApNB4dUb.
110 *Ibid.*, p. 9.

which are investing heavily in their own defence industries.[111] Russia's share in India's arms imports during this period, while still substantial at roughly 36 per cent, has fallen from 72 per cent in 2010–2014. By contrast, the role of Western suppliers in India is growing.[112] Moreover, much of Russia's arms exports to India are in the form of technology transfers and licensed production,[113] which over the long term will strengthen India's defence industry and reduce demand for imports. Meanwhile, China's imports fell by 64 per cent from 2015–2019 to 2020–2024, and may come to occupy Russia's niche and market share in the global arms market.[114]

These developments should be concerning for Rostec and the Russian political leadership for a number of reasons. Firstly, as mentioned earlier, exports allow industry to attain economies of scale and thereby reduce unit costs. They also help compensate for lulls in domestic orders and relatively unprofitable contracts with the MOD. While less of an issue for mass production of legacy systems for the war, this could hobble the development of new systems and undermine Rostec's long-term position in export markets. From a financial standpoint, SIPRI data on falling exports suggest that Rostec as a whole is perhaps not as dependent on global markets as it once was, yet the effect might be more pronounced for individual segments. For instance, in its 2024 Annual Report, Rostec subsidiary United Engine Corporation (hereafter referred to by its Russian abbreviation, ODK) stated that its profitability was −10 per cent and that it depended on exports for as much as 69 per cent of its revenues.[115] From the state's perspective, arms exports also provide a number of benefits insofar as they lock buyers into long-term relationships of dependence on Russia for not only arms but also maintenance, upgrades, and spare parts. In this context, reductions in exports could deprive the state of a key lever of influence in its foreign policy.

One question with regard to Russia's arms exports (and production more generally) is the role of unmanned aerial vehicles (UAVs), or drones. Since 2022, Russia has massively increased its output of drones in various models, ranging from first-person view (FPV) drones and loitering munitions such as Lancet, to surveillance drones such as the Orlan-10 and one-way attack drones (e.g., Shahed/Geran). Most of this production is presumably intended for the war in Ukraine, but Rostec has also advertised drones, such as the ZALA Kub-2E loitering munition,[116] for export at

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111 George et al., "Trends in International Arms Transfers," pp. 5, 9.
112 *Ibid.*, p. 9.
113 Reuters, "India signs $248 million deal with Russia for advanced battle tank engines," *Reuters*, 7 March 2025, https://www.reuters.com/business/aerospace-defense/india-signs-248-million-deal-with-russia-advanced-battle-tank-engines-2025-03-07/.
114 George et al., "Trends in International Arms Transfers," p. 9.
115 United Engine Corporation (UEC), 2024 Annual Report (2025), https://www.e-disclosure.ru/portal/files.aspx?id=27324&type=2.
116 Rostec press release, "Kalashnikov will First Showcase the Advanced Strike KUBs in Abu Dhabi," *Rostec*, 21 January 2025, https://rostec.ru/en/media/news/kalashnikov-will-first-showcase-the-advanced-strike-kubs-in-abu-dhabi-/#start.

the International Defence Exhibition (IDEX) in Abu Dhabi in 2025.[117] As SIPRI's methodology[118] only covers aircraft and drones with a minimum loaded weight of 20 kg, and therefore excludes some of the models listed above, it is not possible to quantify Rostec's exports in this category using SIPRI data alone.[119] This being said, the rapid pace of developments in drone and counter-drone technology on the Ukrainian battlefield often means that specific models become obsolete within months of their fielding and could therefore limit the export appeal of Russian drones.[120] Moreover, Russian defence companies' "first-mover" advantages could diminish with time as manufacturers from other countries enter the market, promoting the commoditisation of drones. Nonetheless, Russia's Minister of Industry and Trade Anton Alikhanov has claimed that the export potential of drones amounts to roughly USD 5–12 billion annually, while Ukrainian manufacturers warn that continual battlefield testing gives Russian systems a competitive edge in export markets.[121]

4.4 The State's Wartime Financial Support

Since Russia's invasion of Ukraine, Rostec, and Russia's defence industry more broadly, has benefited from state-subsidised interest rates and concessional loans with low interest rates. In November 2023, for instance, Rostec's banking subsidiary, Novikombank, received funds from Russia's Industrial Development Fund in order to provide guarantees worth RUB 5.3 billion to an Ilyushin project for the development and production of engine nacelles.[122] Two months later, the Russian government announced that it would invest RUB 283 billion from the National Wealth Fund in Rostec for the production of 609 passenger aircraft by 2030. The loan, amounting to roughly 28 per cent of the civilian aircraft programme's trillion-

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117 DEFENCE CENTRAL, "IDEX 2025 | Russian and Chinese Defense Firms Target Global Markets," posted 8 March 2025, by DEFENCE CENTRAL, YouTube, 01:50, https://www.youtube.com/watch?v=aemQ9elV3GU.

118 See https://www.sipri.org/databases/armstransfers/sources-and-methods.

119 Rosoboronexport, "Orlan-10E," *Rosoboronexport*, https://roe.ru/production/aerospace-forces/complexes-with-uavs/orlan-10e/?theme=theme-lightblue; and ZALA, "ZALA Lancet drone: the spear of the 21st century," *ZALA*, 3 September 2019, https://zala-aero.com/en/news/udarnyj-bespilotnik-zala-lancet-kope-xxi-veka/.

120 Ulrike Franke, "Drones in Ukraine: Four lessons for the West," *European Council on Foreign Relations*, 10 January 2025, https://ecfr.eu/article/drones-in-ukraine-four-lessons-for-the-west/.

121 Prime1, "V Minpromtorge otsenili potentsial RF po eksportu BPLA v milliardy dollarov" [The Ministry of Industry and Trade estimated the potential of the Russian Federation for the export of UAVs at billions of dollars], *Prime1,* 14 August 2025, https://1prime.ru/20250814/bpla-860727540.html; Ihor Vyshnevsky, "Kateryna Mykhalko, TSU: «Ukraina mae v nadlyshku dronovi potuzhnosti. Nazyvaemo tse nadlyshkov ne tomu, shcho tse ne treba armii, a tomu, shcho nasha derzhava ne kontraktue»" [Kateryna Mykhalko, TSU: "Ukraine has an abundance of drone power. We call it a surplus not because the army does not need it, but because our state does not contract it"], *dev.ua*, 10 July 2025, https://dev.ua/news/ukraina-maie-v-nadlyshku-dronovi-potuzhnosti-nazyvaiemo-tse-nadlyshkom-ne-tomu-shcho-tse-ne-treba-armii-a-tomu-shcho-nasha-derzhava-tse-ne-kontraktuie-1752068377; and Sasha Vakulina, "Made in Ukraine and battlefield-tested: Kyiv to open up global arms exports," *Euronews*, 25 September 2025, https://www.euronews.com/2025/09/25/made-in-ukraine-and-battlefield-tested-kyiv-to-open-up-global-arms-exports.

122 Rostec press release, "Novikombank predostavil bankovskuiu garantiiu PAO «Il»" [Novikombank provided a bank guarantee to PJSC "Il"], 14 November 2023, https://rostec.ru/media/news/novikombank-predostavil-bankovskuyu-garantiyu-pao-il-/#start. Ilyushin is a subsidiary of OAK, itself a subsidiary of Rostec.

rouble budget, was issued at a 1.5 per cent annual interest rate to Rostec subsidiaries such OAK, ODK, Technodinamika, and Radioelectronic Technologies Concern for procurement, import substitution, and stockpiling of spare parts.[123] At a time when the Russian Central Bank's key rate was 16 per cent (and, at one point, as high as 21 per cent), this reflects exceptionally favourable lending terms.[124] The defence industry's civilian production is also subsidised by state policy requiring government entities and state-owned companies to procure civilian products from the sector.[125]

The Russian government has also channelled funding to the defence industry via more indirect means. On the eve of the invasion, for instance, the Russian president introduced amendments to the law "On State Defence Procurement" that legally oblige commercial banks to provide defence enterprises with preferential loans on terms set unilaterally by the state.[126] In May 2024, Chemezov seemingly alluded to such loans in an interview, explaining that "all loans" taken for production related to the state defence order were "as a rule, subject to subsidised interest rates on the part of the state or concessional loans from our banks, in the range of 5–6 per cent."[127] According to other reports, the preferential rate is as low as 3 per cent.[128]

In part as a result of these measures, corporate debt in Russia has surged by 71 per cent (or circa USD 446 billion) between July 2022 and November 2024, and according to one estimate, subsidised loans to the defence industry and war-related research and development (R&D) constitute just under 10 per cent of Russia's total corporate loan stock.[129] In essence, this debt represents an indirect war expense and shifts financial risk from defence enterprises to the country's banks. As maintained by analyst Craig Kennedy, this serves as a means of concealing the true extent of the war's costs from domestic audiences and Ukraine's supporters, and allows the Russian political leadership to project an image of a "Goldilocks" defence budget: "big enough to be menacing, but small enough to appear sustainable." Perhaps most importantly, this policy means that even if the defence industry will not always be able to acquire the critical inputs needed for the most advanced weapons, money will likely not be an issue for producing equipment with the materials and inputs they have access to.

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123 RuAviation, "Rostec will receive a loan for the production of civilian airplanes."
124 Central Bank of the Russian Federation, Key Rate, https://cbr.ru/eng/hd_base/KeyRate/.
125 Luzin, "Russia's Defense Industry and Its Influence on Policy."
126 Kennedy, "Russia's Hidden War Debt."
127 Kanaev and Parfenteva, "Chemezov to RBC."
128 Maxim Starchak, "Why dozens of Russian enterprises are bankrupt, or heading that way," Defense News, August 7, 2023, https://www.defensenews.com/industry/2023/08/07/why-dozens-of-russian-enterprises-are-bankrupt-or-heading-that-way/.
129 Kennedy, "Russia's Hidden War Debt"; and The Bank of Finland Institute for Emerging Economies, "Strong growth in Russian bank lending continued last year," *BOFIT Weekly Review 07/2025* (14 February 2025), https://www.bofit.fi/en/monitoring/weekly/2025/vw202507_1/.

5 Conclusions

To conclude, this section revisits the questions set out in the report's introduction. First, how is Rostec governed, and what insights does the case of Rostec offer into the Russian state's management of the defence industry? The state's approach to governing the defence sector has leaned heavily on the consolidation of industry into a number of vertically integrated holdings, and the political leadership has tended to prioritise autarky and state control over competing priorities, such as efficiency and innovation. This tendency may in part be explained by the perceived benefits of concentration and centralised control for the state's ability to effectively manage the industry, and is not unique to Russia. Indeed, given the sector's importance for national security, all governments want effective equipment delivered in a reliable, timely manner, which often entails some degree of autarky and control. What makes Rostec unique is its particular configuration as a state corporation, which is arguably as much a result of Russia's neo-patrimonial political economy as of the more generic reasons for state control outlined above. In this way, the case of Rostec epitomises the informal power structures that have become a central feature of the Russian political landscape.

In what ways, then, has this governance model shaped Rostec's conduct and performance? Besides serving as a source of rents for regime insiders, Rostec's legal subordination and informal connection (via Chemezov) to the Russian president ensures that the corporation can act with relative freedom and shields it from predation by any potential competitors to the regime. This privileged position in Russia's political economy has allowed the corporation to grow via state-backed expansion into new markets – both military and civilian – for government contracts and financial support. This also underscores the point made earlier in the report that the defence industry is not like other industries. The organisation of much of the country's defence holdings into a giant state conglomerate like Rostec may be particular to Russia. The distinctive state-industry relationship that results from the defence sector's strategic nature, monopsonistic structure, opacity, and emphasis on combat performance is not, however, a purely Russian phenomenon.

In this context, what challenges has Russia's invasion of Ukraine in 2022 created for Rostec and for the Russian defence industry more broadly? On the one hand, the corporation has continued to expand its holdings and grow its revenues on the back of a massive increase in government military spending. On the other hand, the war has spawned a host of new problems and exacerbated existing ones. In a tight, war-fuelled labour market, Rostec has had to compete against both civilian employers and the armed forces for workers by continually raising salaries. Yet doing so only aggravates inflation and necessitates an increasingly restrictive monetary policy that worsens conditions for the civilian economy. In addition, while sanctions have not prevented Russia from importing some of its defence-critical needs, they have likely forced the defence industry to expend greater resources on sanctions-circumvention schemes. Rostec's ability to finance these, as well as its salary increases, is limited by its low profitability relative to the prevailing credit environment; a trend that is made worse by the loss of export revenues.

These issues have also laid bare the tension between Russia's political system and the leadership's war materiel needs. Control and consolidation have often come at the expense of efficiency, which has been undercut by the corruption implicit in neo-patrimonial forms of governance, as well as the lack of competition between monopolistic defence-industrial holdings. While Chemezov still occupies a key position in the political system, continued setbacks on the battlefield could push Putin to replace his old friend with a technocratic figure to revamp Rostec. Yet it would not be the first time that top executives in the defence sector have been ousted since the war, and even if someone new were parachuted into Chemezov's post, they would still have to contend with a vast industry beset by an array of structural issues.[130] The likelihood of remedying these in a timeframe relevant for the war appears slim.

However, both Rostec and the defence industry more broadly remain essential for Russia's war against Ukraine, on which Putin has staked his political survival – not to mention his geopolitical ambitions for Russia as a "great power." Rostec will undoubtedly need continued state support to maintain current levels of production and expand them further, but this support will be forthcoming under current conditions. While the constraints outlined above may prevent Rostec from delivering the cutting edge in defence technology, the corporation may still be able to supply "good enough" legacy systems at scale.

In this sense, and in the context of the war, Rostec and the Russian defence industry's future is as much a question of macroeconomics as it is of industrial constraints. The constraining factor on Rostec's output will not be the profitability or financial sustainability of its enterprises, but rather: the state's fiscal capacity, availability of labour (including by coercive means), access to foreign inputs, and availability of existing equipment stocks for reactivation or modernisation. The broader health of Russia's economy may also prove decisive, though assessing the likelihood or potential impact of risks such as hyperinflation or a credit crisis lies beyond the scope of this report. So far, Russia has managed to steer clear of a full-blown meltdown of its financial system.[131] Meanwhile, the West has a key part to play in these developments via its sanctions policies and military support for Ukraine.

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130 In November 2024, for instance, OAK dismissed the CEO and Managing Director of Yakovlev and Tupolev, respectively, reportedly due to poor performance. See Aygul Abdullina, "OAK uvolila gendirektora «Iakovleva» i upravliaiushchego direktora «Tupoleva»" [OAK dismissed the general director of Yakovlev and the managing director of Tupolev], *Kommersant*, 25 November 2024, https://www.kommersant.ru/doc/7326719?from=top_main_3; The Moscow Times, "Russian Aircraft Manufacturer Ousts Top Executives Amid Production Setbacks," *The Moscow Times*, 25 November 2024, https://www.themoscowtimes.com/2024/11/25/russian-aircraft-manufacturer-ousts-top-executives-amid-production-setbacks-a87117.

131 See Emil Wannheden, "Steady under fire? The Central Bank of Russia and the wartime economy," *FOI Memo 9014*, November 2025, https://foi.se/rapporter/rapportsammanfattning.html?reportNo=FOI+Memo+9014.

The aim of this report has been to sketch the broad contours of Rostec's development and identify the challenges it faces in the context of the war, but important questions remain regarding the extent of these challenges. Rostec may be facing headwinds, but just how severe are these, how has the corporation adapted, and to what degree can it continue to do so? Moreover, assuming that factors like sanctions enforcement (or lack thereof) can meaningfully affect the Russian state's capacity and will to fight in Ukraine, when might they do so? Analysts have been calling attention to structural issues in Russia's defence industry since before the start of the full-scale invasion, especially the technological gap with Western industry. While this is relevant for weighing the balance of forces over the long term, it seems less so in the timeframe of the current war, which has brought questions of attrition, industrial mobilisation, and economic resilience and endurance to the forefront of the debate. Only by taking these issues into account will it become clear how long Russia's defence industry can sustain the war, and where its limits lie.

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