

The Iranian Manual: How Russia Learned to Evade the West

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1. Introduction

International sanctions against Russia, which began with its annexation of Crimea in 2014 and escalated significantly after the full-scale invasion of Ukraine in 2022. These sanctions have substantially challenged Moscow's geopolitical and economic stability. Facing intensified isolation from Western economies, Russia has actively sought effective methods to circumvent these measures, notably turning to nations experienced in evasion techniques.

Among these, Iran stands out for its long-standing exposure to stringent international sanctions, first imposed over its nuclear program, and progressively extended to cover ballistic missile development, destabilizing regional activities, human rights violations, and more recently, the transfer of arms to Russia amid the war in Ukraine¹. Iran's prolonged exposure to such sanctions has allowed it to develop a sophisticated array of evasion methods, offering a valuable example from which Russia learned. The strategic value of studying Iranian practices is further underscored by structural similarities between the two nations' economies, both heavily reliant on hydrocarbon exports.

Sanctions targeting these vital sectors have severely restricted their capacity to achieve their goals. Consequently, the parallel nature of sanctions, comprising stringent financial barriers, restrictions on technology transfers, and prohibitions on exports, has facilitated Russia's ability to effectively adopt and refine Iranian evasion strategies. The inherent compatibility between the economic vulnerabilities of these states and the nature of Western-imposed restrictions has significantly simplified Russia's process of replicating and adapting Iranian methods.

This study will focus on how Russia has copied and adapted Iranian evasion techniques to counter Western sanctions. It will also analyze the similarities and differences between the two countries' approaches, highlighting how variations in their contexts, capabilities, and strategic goals have shaped their respective strategies. Towards the end of this research, the analysis will assess whether these methods have enabled Russia to effectively mitigate the economic and geopolitical pressures resulting from the sanctions.

¹ Council of the European Union. (2025). Timeline – EU sanctions against Iran. Consilium.
<https://www.consilium.europa.eu/en/policies/sanctions-against-iran/timeline-eu-sanctions-against-iran/>

2. Diplomacy in the Shadow of Sanctions

Iran–Russia relations

Before the 1979 Islamic Revolution, Russia and Iran shared a long and complex history marked by rivalry, imperial influence, and intermittent cooperation, particularly over control in the Caucasus and Central Asia². Beginning in 1989, Russia and Iran initiated extensive cooperation across commercial, cultural, technical, military, and civilian nuclear sectors, leading Russia to become Iran's primary supplier of military imports by the late 1990s. In 1995, however, Russia agreed to limit its nuclear assistance and suspend advanced weaponry sales to Iran in exchange for a commitment from the United States to refrain from imposing economic sanctions, a decision that underscored Russia's pragmatic willingness to cooperate with the West and simultaneously fueled Iranian skepticism regarding Moscow's reliability³.

The onset of Syria's civil war marked a significant turning point in their bilateral relations, ushering in an unprecedented level of direct military collaboration, despite lingering tensions within their partnership. After Russia's annexation of Crimea in 2014 and its subsequent alienation from the West, Moscow increasingly pivoted towards non-Western partners, including Iran, transforming their relationship from a primarily transactional dynamic into a more strategically aligned partnership, particularly evident in their coordinated military operations in Syria⁴.

This partnership deepened further in 2016 when Iran permitted Russian use of the Shahid Nojeh Air Base for operations in Syria and opened its airspace for Russian cruise missile strikes. Nonetheless, despite intensified cooperation in Syria, the bilateral relationship maintained a pragmatic dimension; Russia preserved its strategic ties with Israel and continued collaborating with OPEC members, notably Saudi Arabia and the UAE, often undermining Iranian interests in the global oil markets⁵.

Following Russia's full-scale invasion of Ukraine in 2022, Tehran and Moscow significantly expanded their collaboration, engaging systematically across military, economic, and diplomatic domains in a coordinated response to their shared external threats and vulnerabilities. Between 2022 and 2023, the two states formalized their growing partnership by signing numerous agreements, including a notable 20-year cooperation plan and a memorandum of understanding on judicial collaboration, clearly signaling their intent to institutionalize and deepen strategic connections⁶.

² Waller, J. G., Wishnick, E., Sparling, M., & Connell, M. (2025). *The Evolving Russia-Iran Relationship: Political, Military, and Economic Dimensions of an Improving Partnership*. CNA Corporation. <https://www.cna.org/reports/2025/01/The-Evolving-Russia-Iran-Relationship.pdf>

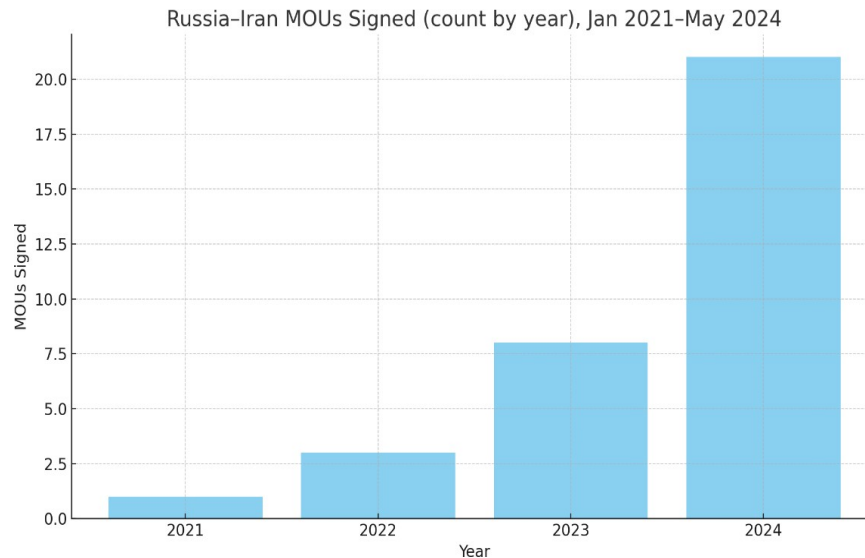
³ Grisé, M., & Evans, A. T. (2023). *The drivers of and outlook for Russian-Iranian cooperation*. RAND Corporation. <https://doi.org/10.7249/PEA2829-1>

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

Source: CNA, *The Evolving Russia-Iran Relationship*, January 2025, <https://www.cna.org/reports/2025/01/The-Evolving-Russia-Iran-Relationship.pdf>.



Further solidifying this trajectory, in January 2024, Iran and Russia signed another long-term cooperation agreement explicitly designed to strengthen their strategic alignment; while the arrangement avoided officially designating their relationship as a formal "strategic alliance," it clearly indicated their mutual intention to solidify bilateral ties and jointly confront Western influence. Concurrently, diplomatic coordination between the two countries intensified through multilateral forums such as BRICS and the Shanghai Cooperation Organization (SCO), where Russia supported Iran's accession, underscoring their shared goal of challenging the Western-led international order⁷.

A Possible Scenario for the Evolution of the Iran-Russia Partnership

As their strategic alignment continues to deepen, Iran and Russia are increasingly exploring new avenues of cooperation that extend beyond traditional military engagements. A particularly noteworthy aspect of this evolving relationship is the consideration of alternative maritime routes that could enhance military connectivity while circumventing geopolitical constraints imposed by existing international agreements. One of the most strategic alternatives involves the Volga–Don Canal, a key waterway linking the Caspian Sea with the Sea of Azov and ultimately the planetary ocean via the Black Sea. Historically used by Russia to transfer military vessels between the Caspian and Black Seas, this canal offers Moscow strategic flexibility to project power into the broader region. In recent years, Iran has actively supported Russia's efforts to increase the canal's capacity, including assisting in dredging operations along the Volga River to accommodate larger vessels and facilitate transit to Astrakhan and beyond⁸.

⁷ Friedrich Naumann Foundation for Freedom. (2024). *Iran–Russia relations and their impact on European and global security*. https://shop.freiheit.org/download/P2@1742/862471/PP_Analyse_IranRussiaRelations_ENG_final.pdf

⁸ Fanger, S. (2024). *Russia's Weapons Transport Via the Caspian Sea*. Caspian Policy Center. <https://www.caspianpolicy.org/research/security/russias-weapons-transport-via-the-caspian-sea>

Hypothetical route for Iranian vessels to reach the Black Sea while bypassing the Montreux Convention. Zoomed-in section sourced from Caspian Policy center.



For Iran, this collaboration represents a vital opportunity to establish a direct military maritime link to the Black Sea, effectively bypassing the restrictive terms of the Montreux Convention, which applies exclusively to warships and limits the transit of naval forces belonging to non-Black Sea states through the Turkish Straits. By navigating through Russian inland waterways instead, Iran could potentially avoid these constraints and gain indirect access to the Black Sea without falling under the Convention's jurisdiction. The prospect of Iranian military vessels departing from the Caspian Sea, transiting through Russian territory, and reaching the Black Sea via the Volga–Don Canal underscores a potential evolution in strategic cooperation between Moscow and Tehran. While this scenario remains hypothetical, the infrastructural and diplomatic groundwork already in motion points to a deliberate strategy aimed at consolidating a resilient Iran–Russia partnership with broader geopolitical implications⁹.

Strategic Foreign Policy Shifts

Foreign policy change refers to a state's deliberate shift in its external relations strategies, encompassing adjustments in diplomatic, economic, or military engagements to achieve specific international objectives. For nations facing international sanctions, such shifts are often necessary to alleviate economic pressures and restore global relations.

Under President Ahmadinejad (2005–2013), Iran adopted a confrontational posture toward the West, prioritizing regional dominance and nuclear development, deepening Tehran's isolation from global institutions while drawing it closer to anti-Western states¹⁰. Following the imposition of U.N. sanctions around 2006, Iran strategically pivoted eastward,

⁹ Fanger, S. (2024). *Russia's Weapons Transport Via the Caspian Sea*. Caspian Policy Center. <https://www.caspianpolicy.org/research/security/russias-weapons-transport-via-the-caspian-sea>

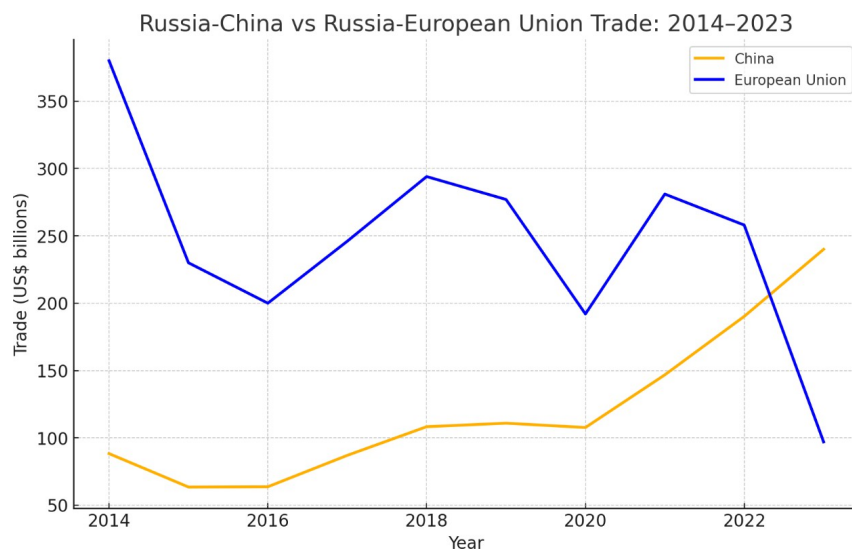
¹⁰ Ahmad, M. M. F., & Ali, O. A. (2022). *Iranian foreign policy phases 1979–2017*. International Journal of Social Relevance & Concern, 10(5), 29–36. <https://ijournals.in/wp-content/uploads/2022/05/4.IJSRC-100407-Mahdi.pdf>

seeking to replace strained Western ties by strengthening relations with China and Russia¹¹. After the U.S. withdrew from the JCPOA in 2018, Iran accelerated this shift, combining ideological defiance with pragmatic economic realignment¹².

Iran formalized its partnership with China through a 25-year cooperation agreement signed in 2021, integrating into the Belt and Road Initiative, signaling a long-term strategic commitment. That same year, Iran joined the Shanghai Cooperation Organization (SCO) and increased its engagement with BRICS states, using these platforms to challenge Western dominance¹³. In 2023, Tehran was invited to join BRICS, further institutionalizing its pivot toward non-Western coalitions¹⁴.

Following its 2014 annexation of Crimea and subsequent Western sanctions, Russia adopted a similar eastward strategy, increasingly engaging with China and other Eastern partners to reduce dependence on Western institutions. Moscow secured significant energy deals, including a multibillion-dollar gas pipeline, and collaborated with Beijing to develop alternative financial systems¹⁵. Though asymmetrical, the Russia-China relationship matured into a partnership focused on mutual interests¹⁶.

Source: Observer Research Foundation, *A Decadal Review of Russia-China Economic Relations, 2024*, <https://www.orfonline.org/research/a-decadal-review-of-russia-china-economic-relations>.



¹¹ Sanaei, M., & Karami, J. (2021). *Iran's Eastern policy: Potential and challenges*. *Russia in Global Affairs*, 19(3), 25–49. <https://doi.org/10.31278/1810-6374-2021-19-3-25-49>

¹² Azizi, H. (2024). *Iran's evolving foreign policy structure: Implications on foreign relations*. Middle East Council on Global Affairs. https://mecouncil.org/wp-content/uploads/2024/06/ME-Council_Issue-Brief-_Irans-Foreign-Policy-_WEB.pdf Bousso, R. (2025). China trade spat undermines Trump's 'max pressure' Iran campaign. *Reuters*. <https://www.reuters.com/world/china-trade-spat-undermines-trumps-max-pressure-iran-campaign-bousso-2025-04-10/>

¹³ Azizi, H. (2024). *Iran's evolving foreign policy structure: Implications on foreign relations*. Middle East Council on Global Affairs. https://mecouncil.org/wp-content/uploads/2024/06/ME-Council_Issue-Brief-_Irans-Foreign-Policy-_WEB.pdf

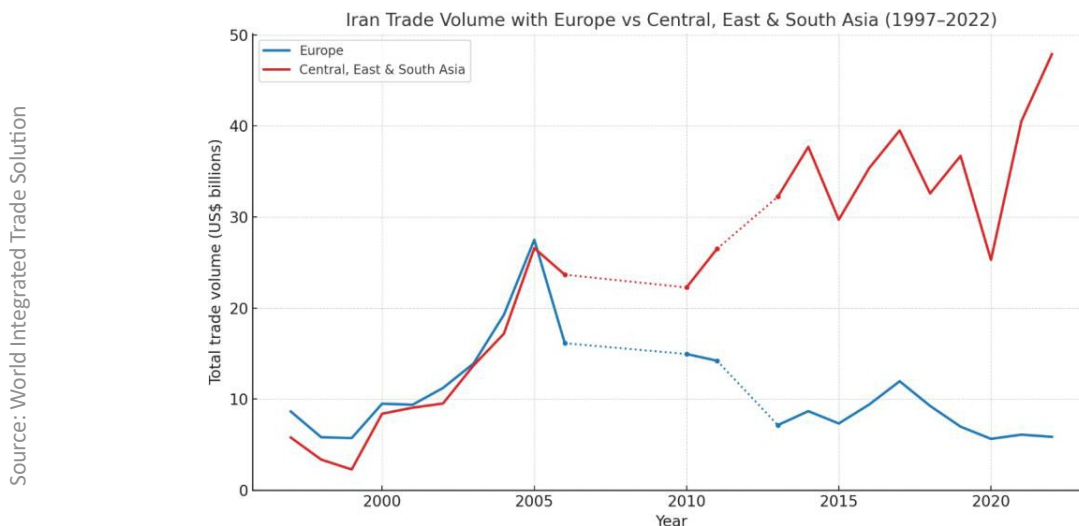
¹⁴ Reuters. (2023). *BRICS invites six countries including Saudi Arabia, Iran to be new members*. <https://www.reuters.com/world/brics-invites-six-countries-including-saudi-arabia-iran-be-new-members-2023-08-24/>

¹⁵ Gabuev, A. (2016). *Friends with benefits? Russian-Chinese relations after the Ukraine crisis*. Carnegie Endowment for International Peace. <https://carnegieendowment.org/2016/06/29/friends-with-benefits-russian-chinese-relations-after-ukraine-crisis-pub-63953>

¹⁶ Campbell, P. (2024). *China–Russia relations and prospects for regional stability: A historical and conceptual investigation* [Tesi di dottorato, Bond University]. Bond University Research Portal. <https://research.bond.edu.au/en/studentTheses/china-russia-relations-and-prospects-for-regional-stability-a-his>

Russia also expanded its multilateral diplomacy, particularly within the SCO and BRICS, to enhance global standing. At the 2014 BRICS summit in Fortaleza, members including Russia denounced eastern unilateral sanctions and promoted a multipolar world order¹⁷. After the 2022 invasion of Ukraine, Moscow actively advocated for BRICS expansion as a counterweight to Western isolation¹⁸.

Iran shifted away from European markets, deepening economic engagement with Asian economies, framing this transition as a consolidation of domestic control and a response to Western aggression¹⁹. Similarly, Russia cultivated relations with countries unwilling to join Western sanctions. After 2022, India emerged as Russia's leading oil buyer, maintaining significant energy cooperation despite Western pressure²⁰. Russia also expanded regional influence through energy diplomacy and military outreach, notably partnering with Saudi Arabia since 2016 to form OPEC+, aligning oil policy to counteract economic pressure and support its revenues²¹.



Iran leveraged its military involvement in Syria and Iraq, particularly against ISIS, as diplomatic leverage in negotiations with both regional and Western powers²². In 2023, Tehran also restored diplomatic ties with Saudi Arabia through a China-mediated agreement, reflecting a recalibrated regional policy aimed at reducing isolation²³. Meanwhile, Russia pursued a similar strategy in Southeast Asia by deepening cooperation

¹⁷ Seshadri, C. (2023). *Western sanctions on Russia and the Global South's stance*. Royal United Services Institute. <https://www.rusi.org/explore-our-research/publications/commentary/western-sanctions-russia-and-global-souths-stance>

¹⁸ Reuters. (2023). *Russia says expansion will strengthen BRICS*. <https://www.reuters.com/world/europe/russia-says-expansion-will-strengthen-brics-2023-08-03/>

¹⁹ Borszik, O. (2016). *International sanctions against Iran and Tehran's responses: Political effects on the targeted regime*. *Contemporary Politics*, 22(1), 20–39. <https://doi.org/10.1080/13569775.2015.1112951>

²⁰ Verma, N., & Ahmed, A. (2022). *India's imports of cheap Russian crude surge since Ukraine invasion*. Reuters. <https://www.reuters.com/business/energy/indias-imports-cheap-russian-crude-surge-since-ukraine-invasion-2022-05-30/>

Ghaddar, A., Lawler, A., & Edwards, R. (2022). *OPEC+ agrees deep oil production cuts, Biden calls it shortsighted*. Reuters. <https://www.reuters.com/business/energy/opec-heads-deep-supply-cuts-clash-with-us-2022-10-04/>

²² Seeberg, P. (2016). *The EU and the international sanctions against Iran: European and Iranian foreign and security policy interests, and a changing Middle East*. Palgrave Communications, 2, Article 16080. <https://doi.org/10.1057/palcomms.2016.80>

²³ Hafezi, P., El Yaakoubi, A., & Pomfret, J. (2023). *Frustrated Khamenei pushed for Saudi-Iran deal clinched in China*. Reuters. <https://www.reuters.com/world/middle-east/frustrated-khamenei-pushed-saudi-iran-deal-clinched-china-2023-03-16/>

with Vietnam in defense, energy, and trade, framing this as a continuation of historical Soviet-era ties and a means of countering Western influence in the region²⁴.

In Africa, Moscow combined military engagement, notably through the Wagner Group in Mali, the Central African Republic, and Libya, with economic initiatives such as grain diplomacy to bolster its presence and counter Western influence. This strategy was institutionalized at the 2019 Russia–Africa Summit²⁵. Following the Wagner mutiny and Prigozhin's death, the Kremlin moved to tighten control of the group, shifting focus to Burkina Faso and Niger. Russian fossil fuel exports to Africa rose sharply in 2023, with Lavrov's increased visits aimed at securing African support by leveraging anti-Western sentiment²⁶.

African countries visited by Russian Foreign Minister Sergei Lavrov since the 2022 invasion of Ukraine, up to June 2025



The key political difference between Russia and Iran lies in how they use multilateral institutions like BRICS and SCO to combat international isolation. For Iran, joining these organizations represents a necessary reaction to its growing diplomatic and economic isolation, viewing them primarily as a lifeline to reduce dependence on the West and maintain economic stability. In contrast, Russia adopts a far more aggressive and proactive strategy, leveraging these alliances not just to alleviate its own isolation but to actively reshape the global order, challenge Western influence, and assert its role as a major power.

3. The Struggle for Technological Sovereignty

Domestic Technological Development

Domestic technological development refers to a nation's capacity to independently design, produce, and innovate technologies, reducing reliance on external sources or enabling product creation for export. Autocratic regimes often prioritize inward-looking self-sufficiency, while peaceful democracies typically develop technologies aimed at international cooperation and export. For sanctioned nations, domestic technological growth becomes crucial to maintain economic stability and national security by minimizing foreign dependence.

²⁴ Hamilton, R. E., & Primiano, C. (2025). *Russia and China in the Indo-Pacific: China's use of the instruments of power*. Foreign Policy Research Institute. <https://www.fpri.org/article/2025/03/russia-and-china-in-the-indo-pacific-chinas-use-of-the-instruments-of-power/>

²⁵ Fabricius, P. (2023). *From Russia, with little to show for it*. Institute for Security Studies. <https://issafrica.org/iss-today/from-russia-with-little-to-show-for-it>

²⁶ Ferragamo, M. (2023). *Russia's growing footprint in Africa*. Council on Foreign Relations. <https://www.cfr.org/backgroundunder/russias-growing-footprint-africa>

Under significant pressure, Iran prioritized import substitution with domestic production. In 2012–13, Iran's finance minister reported domestic manufacturing growth sufficient to counteract a 14% drop in imports due to sanctions, attributing this to internal economic absorption by local producers²⁷. Iran also developed a substantial domestic arms industry, introducing systems such as the Bavar-373 long-range mobile surface-to-air missile in 2019, a domestic alternative to Russia's S-300²⁸. By the early 2020s, Iran's industrial production surpassed pre-sanction levels due to policies supporting medium-to-high technology sectors, including dual-use industries²⁹.

In August 2020, Iran showcased domestically developed surface-to-surface missiles with ranges up to 1,400 km and cruise missiles exceeding 1,000 km³⁰. By August 2023, Iran announced the acquisition of supersonic cruise missile technology and began testing systems designed to evade interceptors, alongside introducing its first domestically produced hypersonic ballistic missile³¹. Iran significantly boosted drone manufacturing, delivering 1,000 domestically built UAVs with stealth features and a range of 2,000 km by January 2025³².

Similarly, Russia responded to sanctions by prioritizing domestic technological development. Following the 2014 annexation of Crimea, Putin emphasized meeting defense needs domestically due to sanctions creating "new circumstances"³³. By 2015, Russia had launched approximately 2,500 import-substitution projects supported by about 2.5 trillion rubles (\$32 billion USD), increasingly relying on domestic and dual-use suppliers to sustain military production³⁴.

Russia's aviation industry was targeted for domestic reconstruction, with projects like the MS-21 and Sukhoi Superjet shifting to the internally developed PD-14 and PD-8 engines, and government efforts aimed at ramping up output³⁵. However, progress has been slow,

²⁷ Nichols, M. (2013). *Iran says domestic production grows to offset drop in imports*. Reuters. <https://www.reuters.com/article/markets/us/iran-says-domestic-production-grows-to-offset-drop-in-imports-idUSL2N0DA1IL/> ²⁸ Reuters. (2019). *Iran displays domestically built mobile missile defence system*. <https://www.reuters.com/article/world/iran-displays-domestically-built-mobile-missile-defence-system-idUSKCN1VC0FJ/>

²⁹ Kalb, D. (2024). *Mobilized resilience and development under sanctions in Iran*. *Development and Change*, 55(3), 456–475. <https://doi.org/10.1111/dech.12859>

³⁰ Hafezi, P. (2020). *Iran announces locally made ballistic and cruise missiles amid U.S. tensions*. Reuters. <https://www.reuters.com/article/world/iran-announces-locally-made-ballistic-and-cruise-missiles-amid-us-tensions-idUSKBN25G0NJ/>

³¹ Reuters. (2023). *Iran says it has obtained supersonic cruise missile technology*. <https://www.reuters.com/world/iran-says-it-has-obtained-supersonic-cruise-missile-technology-tasnim-2023-08-09/>

Reuters. (2023). *Iran's hardline rulers see missile systems as vital deterrent*. <https://www.reuters.com/world/middle-east/irans-hardline-rulers-see-missile-systems-vital-deterrent-2023-06-06/>

³² Reuters. (2025). *Iranian army takes delivery of 1,000 new drones*. <https://www.reuters.com/world/middle-east/iranian-army-takes-delivery-1000-new-drones-2025-01-13/>

³³ Sherman, J. (2024). *Russia's digital tech isolationism: Domestic innovation, digital fragmentation, and the Kremlin's push to replace Western digital technology*. Atlantic Council. https://dfrlab.org/wp-content/uploads/sites/3/2024/07/AC_CSI_Russias_Digital_Tech_Isolationism.pdf

³⁴ Bush, J. (2015). *Russia's import-substitution drive will take years – and may be misguided*. Reuters. <https://www.reuters.com/article/world/russia/russias-import-substitution-drive-will-take-years-and-may-be-misguided-idUSKCN0RV4W6/> Sherman, J. (2024). *Russia's digital tech isolationism: Domestic innovation, digital fragmentation, and the Kremlin's push to replace Western digital technology*. Atlantic Council. https://dfrlab.org/wp-content/uploads/sites/3/2024/07/AC_CSI_Russias_Digital_Tech_Isolationism.pdf

³⁵ Stolyarov, G. (2022). *Exclusive: Russia aiming to fly solo without Airbus and Boeing*. Reuters. <https://www.reuters.com/business/aerospace-defense/exclusive-russia-aiming-fly-solo-without-airbus-boeing-2022-09-28/>

and Western sanctions have severely disrupted the sector, causing delays, limiting access to key components and exposing the gap between ambition and actual capabilities³⁶.

Between 2023 and 2024, Russia significantly increased domestic arms manufacturing to compensate for wartime losses, focusing on mass-producing drones, missiles, and artillery shells. Missile and artillery factories operated continuously, maintaining production of systems like Kalibr cruise missiles and Iskander SRBMs. The initial push relied heavily on refurbishing Soviet-era equipment as a temporary fix, but with those reserves nearly depleted, the defense-industrial base is increasingly struggling to maintain output. Russia also revived its machine-tool industry, traditionally reliant on imports, developing "Swiss-style" CNC mills domestically and sourcing equipment from partners such as China. Efforts in 3D printing and local defense-part fabrication continue, although achieving complete self-sufficiency remains a long-term objective³⁷.

Reverse Engineering

Reverse engineering is the practice of analyzing an existing product to recreate its design and function. The U.S. Defense Logistics Agency defines it as "replicating a design by physically examining and measuring an existing item to develop the technical data necessary"³⁸. In military contexts, this often involves dismantling foreign or captured military and dual-use systems such as electronics, engines, and weapon hardware to reproduce them domestically. For sanctioned countries, reverse engineering becomes essential when import restrictions block access to critical technologies.

Iran has extensively relied on reverse engineering to circumvent export controls and sustain its military development. It produced the Nasr-1 and Kosar-1 anti-ship missiles by replicating Chinese C-704 and C-701 models and developed the Soumar and Hoveyzeh long-range cruise missiles using old Soviet designs³⁹. Iran's Toophan anti-tank missile is based on the U.S. BGM-71 TOW, and after downing a U.S. RQ-170 stealth drone in 2011, Tehran presented its own version derived from the captured platform⁴⁰. Iran's first indigenously produced fighter jet, the HESA Kowsar, is widely considered a reverse-engineered version of the U.S. Northrop F-5, with analysts noting its nearly identical frame and design features⁴¹.

The IRGC institutionalized reverse engineering within Iran's drone program. Treasury reports confirm that IRGC-linked firms acquired U.S. and Israeli drones to create domestic

³⁶ Kolomychenko, M. (2018). *Exclusive: Russian high tech project flounders after U.S. sanctions*. Reuters.

<https://www.reuters.com/article/business/exclusive-russian-high-tech-project-flounders-after-us-sanctions-idUSKCN1MR1LP/>

³⁷ Apps, P. (2024). *The Western industrial components rebuilding Russia's military*. Reuters. <https://www.reuters.com/world/europe/western-industrial-components-rebuilding-russias-military-2024-08-16/>

³⁸ Defense Logistics Agency. (n.d.). *Reverse Engineering*. <https://www.dla.mil/Aviation/Offers/Engineering/Reverse-Engineering/>

³⁹ Tomasso, J. (2025). *Issues of the Iranian defence industry and strategic choices: Resistance without an axis?* IRIS. <https://www.iris-france.org/en/issues-of-the-iranian-defence-industry-and-strategic-choices-resistance-without-an-axis/>

⁴⁰ Bertrand, N., Herb, J., & Cohen, Z. (2023). *Russia sending U.S. weapons captured in Ukraine to Iran, sources say*. CNN. <https://edition.cnn.com/2023/03/10/politics/russia-iran-ukraine-weapons/index.html>

⁴¹ Stocker, J. (2018). *Iran's first indigenously developed fighter jet looks a lot like the American F-5*. The Defense Post. <https://thedefensepost.com/2018/08/21/iran-kowsar-fighter-jet-f-5/>

Side-by-side comparison of the Iranian HESA Kowsar (left) and the U.S. Northrop F-5 (right)



UAV models, including the Shahed-series⁴². The Shahed-136 drone, for instance, runs on a German-made Limbach L550E engine that Iran illicitly obtained and replicated two decades ago⁴³. Iran reportedly scavenges battlefields for damaged U.S. and Israeli equipment to recover technologies for study and replication, particularly in ongoing regional conflicts⁴⁴.

Following Western sanctions in 2014, Russia similarly adopted reverse engineering as a core strategy to restore its military-industrial capacity. At the Alabuga Special Economic Zone, officials described efforts to conduct reverse engineering and import substitution to localize UAV production⁴⁵. Russia's national import substitution plan has heavily relied on reverse engineering, although analysts note mixed results due to shortages of skilled labor and modern equipment⁴⁶. Defense firms in Russia now specialize in reverse-engineering services. The U.S. has sanctioned entities such as the "Center of Digital Technologies," which provides 3D scanning, 3D printing, and reverse engineering to support domestic aerospace and machinery production⁴⁷.

Russian engineers have reverse-engineered key aviation technologies to replace lost Western imports. The PD-14 and PD-8 jet engines were modeled on the U.S. Pratt & Whitney PW1000G and the SaM146, itself based on Ukraine's D-436 engine technology⁴⁸. Russia also turned to captured NATO equipment for technical analysis. State-owned Rostec announced efforts to reverse-engineer Leopard 2 tanks and other Western armored vehicles to improve its own tank munitions⁴⁹. Uralvagonzavod, a Russian machine-building company, reportedly received U.S. M1 Abrams and German Leopard

⁴² U.S. Department of the Treasury. (2024). *On Second Anniversary of Russia's Further Invasion of Ukraine and Following the Death of Aleksey Navalny, Treasury Sanctions Hundreds of Targets in Russia and Globally*. <https://home.treasury.gov/news/press-releases/jy2117>

⁴³ Bennett, D., & Ilyushina, M. (2023). *Inside the Russian effort to build 6,000 attack drones with Iran's help*. The Washington Post. <https://www.washingtonpost.com/investigations/2023/08/17/russia-iran-drone-shahed-alabuga/>

⁴⁴ Debinski, G. (2023). *How Iran beats Russia at sanctions game*. GZERO Media. <https://www.gzeromedia.com/how-iran-beats-russia-at-sanctions-game>

⁴⁵ U.S. Department of the Treasury, *op. cit.*

⁴⁶ Gorenburg, D., Bendett, S., Gause, K., Luzin, P., Rosa-Hernandez, G. I., Schwartz, P., & Wishnick, E. (2024). *Crafting the Russian War Economy: The Effects of Export Controls on Russia's Defense Industrial Production*. CNA. <https://www.cna.org/reports/2024/10/Crafting-the-Russian-War-Economy.pdf>

⁴⁷ U.S. Department of the Treasury, *op. cit.*

⁴⁸ Gorenburg, D., et al., *Crafting the Russian War Economy*.

⁴⁹ TASS. (2024). *Rostec developing new tank shells based on study of NATO trophies*. <https://tass.com/defense/1771775>

2A6 tanks for disassembly, examining features like composite armor and fire-control systems for replication purposes⁵⁰.

Technological Partnership

Technological partnerships are collaborative agreements, often between governments or firms, to share, co-develop, or transfer technology and expertise. In practice, they can take the form of formal joint ventures, licensing deals, or even covert procurement channels. Iran has expanded its defense partnership with Russia across multiple domains. In 2024, Iranian officials confirmed the purchase of Russian-made Su-35 fighter jets under a new 20-year strategic pact⁵¹. Reports also indicate that Iran plans to acquire Mi-28 attack helicopters and possibly S-400 air defense systems from Russia⁵². Tehran and Moscow have jointly established military production capabilities. The two countries agreed to build a factory in Russia's Tatarstan to manufacture Iranian-designed Shahed attack drones, with a production target of 6,000 units by 2025⁵³. Tehran has likewise shared missile expertise, as seen in the resemblance between Iran's Shahab-3 and North Korea's Nodong missile, a similarity noted by UN observers⁵⁴.

Iran has also relied on Russian assistance for space launches. In October 2024, Russian rockets placed two domestically made Iranian satellites into orbit, reflecting growing bilateral cooperation in space technology⁵⁵. Long-standing nuclear cooperation between Iran and Russia has continued to evolve. In April 2025, Russia committed to financing the construction of a new nuclear power plant in Iran, expanding on its earlier work building the Bushehr reactor. That same month, the two countries signed a deal for 55 bcm/year of gas supplies and agreed on joint projects in Iranian oil and gas fields, further transferring energy technology and engineering expertise to Iran⁵⁶.

⁵⁰ Army Recognition. (2025). *Breaking News: Russia to start reverse engineering on US-supplied M1A1 Abrams tank captured in Ukraine*. <https://armyrecognition.com/focus-analysis-conflicts/army/conflicts-in-the-world/russia-ukraine-war-2022/breaking-news-russia-to-start-reverse-engineering-on-us-supplied-m1a1-abrams-tank-captured-in-ukraine>

⁵¹ Middle East Monitor. (2025). *Iran Revolutionary Guards commander says Iran purchased Russian-made Sukhoi-35 fighter jets*. <https://www.middleeastmonitor.com/20250127-iran-revolutionary-guards-commander-says-iran-purchased-russian-made-sukhoi-35-fighter-jets/>

⁵² Stimson Center. (2024). *Iran and Russia enter a new level of military cooperation*. <https://www.stimson.org/2024/iran-and-russia-enter-a-new-level-of-military-cooperation/>

⁵³ Bergmann, M., Snegovaya, M., Dolbaia, T., & Fenton, N. (2024). *Collaboration for a Price: Russian Military-Technical Cooperation with China, Iran, and North Korea*. Center for Strategic and International Studies. https://csis-website-prod.s3.amazonaws.com/s3fs-public/2024-05/240522_Bergmann_Collaboration_Price.pdf

⁵⁴ Chivvis, C. S., & Keating, J. (2024). *Cooperation Between China, Iran, North Korea, and Russia: Current and Potential Future Threats to America*. Carnegie Endowment for International Peace. <https://carnegie-production-assets.s3.amazonaws.com/static/files/Chivvis%20Keating%20-%20Ch-Ir-Nk-Ru-Cooperation-1.pdf>

⁵⁵ Stimson Center, *Iran and Russia enter a new level of military cooperation*, op. cit.

⁵⁶ Offshore Technology. (2025). *Russia, Iran agree on 55bcm of annual gas supplies*. <https://www.offshore-technology.com/news/russia-iran-55bcm-annual-gas-supplies/>

Since 2022, Russia has received thousands of Iranian-made Shahed combat drones and hundreds of Fateh-110 missiles for use in Ukraine⁵⁷. In May 2025, Western sources reported that Iran is preparing to send Fath-360 missile launchers to Russia to further bolster its strike capabilities on the Ukrainian front⁵⁸. Beyond hardware transfers, Russia exports military expertise to its partners. Senior Russian missile specialists have reportedly traveled to Iran on multiple occasions to assist in the development of its missile programs⁵⁹.

Cyber-Espionage

Cyber espionage is the act of using digital technologies to gain unauthorized access to confidential information held by individuals, organizations, or governments for strategic, political, or economic advantage. It typically involves covert operations conducted through networks, malware, or social engineering to exfiltrate sensitive data such as intellectual property, trade secrets, or classified government materials⁶⁰. Nations under sanctions increasingly rely on this tactic to access restricted technologies and intelligence they cannot acquire legally, targeting foreign defense firms, research institutions, and governments to steal military designs, industrial software, and economic data⁶¹.

Iran has institutionalized cyber-espionage as a key tool for countering sanctions. Lacking open access to Western technology, Tehran has used hacking to directly strengthen its military and dual-use industries, turning cyber theft into a substitute for blocked imports and embargoed systems⁶². Iranian state-linked groups such as APT33 have consistently targeted foreign aerospace and defense sectors. Since at least 2013, APT33 has conducted cyber operations against U.S. and Saudi aviation and petrochemical firms to extract designs and proprietary information⁶³. In another case, a 2012

U.S. indictment revealed that Iranian operatives hacked Arrow Tech, a Vermont-based defense contractor, to steal missile simulation software and funnel it to Iran's military and universities through IRGC-linked channels⁶⁴.

Iran has also used deceptive cyber techniques to infiltrate defense supply chains. Between 2014 and 2016, the group Flying Kitten created fake websites imitating aerospace conferences and firms like Oshkosh Corp, tricking engineers into revealing

⁵⁷ Bergmann, M., Snegovaya, M., Dolbaia, T., & Fenton, N. (2024). *Collaboration for a Price: Russian Military-Technical Cooperation with China, Iran, and North Korea*. Center for Strategic and International Studies. https://csis-website-prod.s3.amazonaws.com/s3fs-public/2024-05/240522_Bergmann_Collaboration_Price.pdf

⁵⁸ Landay, J., Saul, J., & Ljunggren, D. (2025). *Iran to send Russia launchers for short-range missiles, sources say*. Reuters. <https://www.reuters.com/world/iran-send-russia-launchers-short-range-missiles-sources-say-2025-05-09/>

⁵⁹ Iran International. (2025). *Russia sent missile experts to Iran amid conflict with Israel*. <https://www.iranintl.com/en/202503044006?source=share-link>

⁶⁰ Cyber-Espionage.ch. (n.d.). *From Espionage to Cyber Espionage*. <https://www.cyber-espionage.ch/>

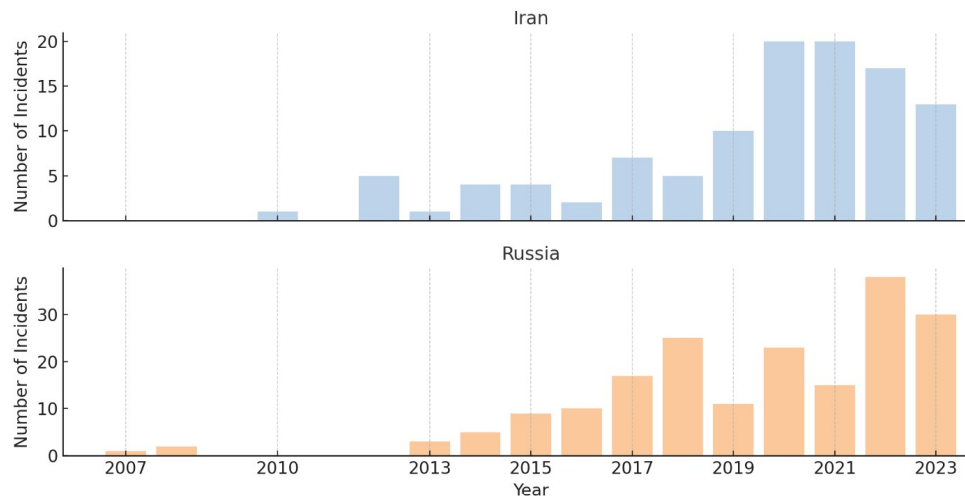
⁶¹ Bing, C. (2017). *Iranian hackers heisted U.S. defense software for clients blocked by sanctions, indictment says*. CyberScoop. <https://cyberscoop.com/iranian-hackers-defense-software-prodas-arrow-tech/>

⁶² Anderson, C., & Sadjadpour, K. (2018). *Iran's Cyber Threat: Espionage, Sabotage, and Revenge*. Carnegie Endowment for International Peace. https://carnegieendowment.org/files/Iran_Cyber_Final_Full_v2.pdf

⁶³ Sadjadpour, K. (2017). *The Electronic Republic: Iran's Resilient Cyber Strategy*. Foreign Affairs. <https://www.foreignaffairs.com/articles/iran/2017-10-31/electronic-republic>

⁶⁴ Anderson, C., & Sadjadpour, K. (2018). *Iran's Cyber Threat: Espionage, Sabotage, and Revenge*. Carnegie Endowment for International Peace. https://carnegieendowment.org/files/Iran_Cyber_Final_Full_v2.pdf

Source: Council on Foreign Relations, *Cyber Operations Tracker*, <https://www.cfr.org/cyber-operations/>



credentials⁶⁵. Beyond the defense sector, Iran has used cyber-espionage to circumvent scientific embargoes. The hacking group Silent Librarian breached more than 300 universities in 22 countries from 2013 onward, stealing 31 terabytes of academic research and login credentials to access restricted science and engineering databases⁶⁶. These operations are coordinated by Iran's security services, particularly the IRGC and the Ministry of Intelligence. Groups such as the Mabna Institute and APT35 (also known as Charming Kitten), both subject to international indictments, have carried out cyber-espionage on Tehran's behalf⁶⁷.

Following the imposition of Western sanctions in 2014, Russia increasingly adopted cyber-espionage as a strategic tool. A former CIA officer noted that Moscow “looked at Iran's playbook” to guide its own illicit cyber activities⁶⁸.

Russian intelligence agencies including the FSB, GRU, and SVR significantly expanded their cyber- operations in response to export bans and embargoes. The SolarWinds breach, disclosed in 2020, was a major example: Russian hackers infiltrated U.S. government networks via compromised software updates and accessed data related to sanctions policy and counterintelligence efforts⁶⁹. As sanctions tightened, Russia prioritized stealing Western dual-use technologies to sustain its military production. Investigations showed that Russian operatives acquired advanced microelectronics and components critical to radar, surveillance, and weapons systems through cyber theft despite embargoes⁷⁰.

⁶⁵ Ibid.

⁶⁶ Hassold, C. (2018). *Testimony before the U.S. House of Representatives: Scholars or Spies—Foreign Plots Targeting America's Research and Development*. U.S. Congress. <https://www.congress.gov/115/meeting/house/108175/witnesses/HHRG-115-SY21-Wstate-HassoldC-20180411.pdf>

⁶⁷ Anderson, C., & Sadjadpour, K. (2018). *Iran's Cyber Threat: Espionage, Sabotage, and Revenge*. Carnegie Endowment for International Peace. https://carnegie-production-assets.s3.amazonaws.com/static/files/Iran_Cyber_Final_Full_v2.pdf

⁶⁸ The Cipher Brief. (2024). *Expert Q&A: Understanding the new Russia-Iran strategic partnership*. https://www.thecipherbrief.com/column_article/expert-qa-understanding-the-new-russia-iran-strategic-partnership

⁶⁹ Reuters. (2021). *Hackers in SolarWinds breach stole data on U.S. sanctions policy, intelligence probes*. <https://www.reuters.com/world/us/hackers-solarwinds-breach-stole-data-us-sanctions-policy-intelligence-probes-2021-10-07/>

⁷⁰ Sherman, J. (2024). *Russia's digital tech isolationism: Domestic innovation, digital fragmentation, and the Kremlin's push to replace Western digital technology*. Atlantic Council. https://dfrlab.org/wp-content/uploads/sites/3/2024/07/AC_CSI_Russias_Digital_Tech_Isolationism.pdf

After the 2022 invasion of Ukraine, Russian cyber-espionage expanded dramatically. Microsoft reported that Russian state hackers targeted 42 countries allied with Ukraine, breaching diplomatic, defense, and energy networks to collect data on military aid, diplomatic plans, and economic measures relevant to the sanctions regime⁷¹. Western intelligence assessments have concluded that mass expulsions of Russian diplomats forced Moscow to lean even more heavily on hacker groups for global espionage and illicit procurement, confirming cyber-operations as a core pillar of Russia's strategy to circumvent international isolation⁷².

The key difference is that Russia has built a broad, coordinated technological strategy, combining domestic innovation, reverse engineering supported by government funding, and a sophisticated global network to obtain restricted technologies, while Iran takes a narrower, reactive approach, focusing on incremental improvements driven by IRGC-led projects and limited partnerships, reflecting its more constrained industrial and technological capacity.

4. The Parallel Economy

Web of Front Companies and Shell Entities

Front and shell companies are corporate entities used to disguise illicit dealings, particularly for sanctions evasion. A front company conducts real commercial activity while secretly serving the interests of a sanctioned actor. A shell company, by contrast, often exists only on paper with no actual operations or assets and is created to obscure ownership and the origin or destination of funds. These entities allow evaders to bypass list-based sanctions by masking who owns or controls assets, concealing financial flows, and hiding the true parties behind restricted dealings⁷³. Sanctioned regimes have developed vast webs of such firms across multiple jurisdictions, creating shadow networks of intermediaries that enable banned transactions to proceed while concealing the sanctioned party's role⁷⁴.

Iran has long relied on front companies to evade sanctions, with their use expanding significantly after multilateral restrictions intensified around 2010. Tehran built a global network of shell firms and fraudulent intermediaries to obscure its role in transactions⁷⁵. Iranian oil is frequently sold through complex chains of front companies that use falsified paperwork to hide its origin and allow revenues to be transferred covertly⁷⁶.

⁷¹ Reuters. (2022). *Russian hacking groups step up cyber espionage against Ukraine allies, Microsoft says*. <https://www.reuters.com/world/russian-hacking-groups-step-up-cyber-espionage-ukraine-allies-microsoft-says-2022-06-22/>

⁷² Jones, S. G. (2025). *Russia's shadow war: Cyber, sabotage, and influence operations*. Center for Strategic and International Studies. https://csis-website-prod.s3.amazonaws.com/s3fs-public/2025-03/250318_Jones_Russia_Shadow.pdf

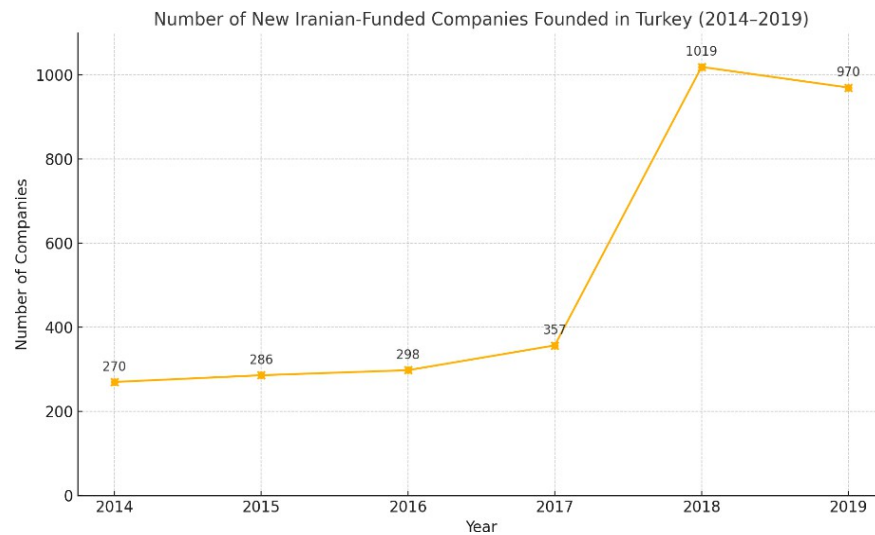
⁷³ FinIntegrity. (n.d.). *The sanctions evasion threat*. <https://finintegrity.org/the-sanctions-evasion-threat/>

⁷⁴ Atlantic Council. (2024). *Global sanctions dashboard: How Iran evades sanctions and finances terrorist organizations like Hamas*. <https://www.atlanticcouncil.org/blogs/econographics/global-sanctions-dashboard-how-iran-evades-sanctions-and-finances-terrorist-organizations-like-hamas/>

⁷⁵ Yalcinkaya, A. (2021). *Economy policy of Iran against financial sanctions*. ResearchGate. https://www.researchgate.net/profile/Alaeddin-Yalcinkaya-2/publication/356182206_ECONOMY_POLICY_OF_IRAN_AGAINST_FINANCIAL_SANCTIONS/links/63e0ee4664fc86063828336d/Economy-Policy-of-Iran-Against-Financial-Sanctions.pdf

⁷⁶ Politico. (2024). *Iran-Russia cooperation dodging oil sanctions*. <https://www.politico.eu/article/iran-russia-cooperation-dodging-oil-sanctions/>

Source: Milliyet, "Arap sermayesi rekor kırdı," <https://uzmanpara.milliyet.com.tr/haber-detay/genel/arap-sermayesi-rekor-kirdi/64352/>; Haber3, "Türkiye'de en fazla şirketi İranlılar açtı," <https://www.haber3.com/ekonomi/turkiyede-en-fazla-sirketi-iranlilar-acti-haberi-5078525>.



These front companies are often registered in countries with relatively weak oversight, including China, the UAE, and Turkey. Iranian businesses use these jurisdictions to reroute payments through offshore structures that obscure the Iranian origin of the goods and services involved⁷⁷. The proliferation of Iranian-linked firms is especially evident in Turkey. Following the U.S. withdrawal from the JCPOA in 2018, 546 Iranian-owned companies were registered in Turkey in the second half of that year, 970 more in 2019, and 725 in 2020, as Tehran adapted its commercial channels to increased sanctions pressure⁷⁸.

Russia has mirrored Iran's use of front and shell companies, especially since 2014. It has established opaque entities in jurisdictions such as Hong Kong, the UAE, India, Malaysia, and Singapore. These companies are often short-lived and quickly reconstituted under new names once sanctioned, forming a rotating network of evasion that complicates enforcement efforts⁷⁹. After the 2022 invasion of Ukraine, sanctioned Russian funds were moved into the UAE via a private equity firm, exploiting weak financial oversight to hide ownership and facilitate continued financial operations⁸⁰.

U.S. sanctions enforcement revealed a Russian network led by arms dealer Igor Zimenkov, which used front companies in Singapore, Cyprus, Bulgaria, Uzbekistan, and Israel to conduct weapons-related deals and move funds on behalf of Moscow⁸¹. On October 30, 2024, the U.S. sanctioned multiple firms based in India, Malaysia, Singapore, and the UAE for their roles in helping Russia evade sanctions and support its military-industrial complex⁸².

⁷⁷ Ibid.

⁷⁸ Yalcinkaya, A., *Economy policy of Iran against financial sanctions*, op. cit. ⁷⁹ Terry, G. S. (Ed.). (2025). *Strategic pathways to ending the Russo-Ukrainian war*. The Conference on Russia Papers. Baltic Defence College. https://www.rusconf.eu/wp-content/uploads/2025/02/Rusconf_25_veeb.pdf

⁸⁰ Donovan, K., Nikoladze, M., Murphy, R., & Bychkovska, Y. (2023). *Global sanctions dashboard: How Iran evades sanctions and finances terrorist organizations like Hamas*. Atlantic Council. <https://www.atlanticcouncil.org/blogs/econographics/global-sanctions-dashboard-how-iran-evades-sanctions-and-finances-terrorist-organizations-like-hamas/>

⁸¹ RFE/RL. (2023). *New U.S. sanctions target Russian arms trader's global network*, Treasury Department says. <https://www.rferl.org/a/new-us-sanctions-russian-arms-traders-network/32250878.html>

⁸² Terry, G. S. (Ed.). (2025). *Strategic pathways to ending the Russo-Ukrainian war*. The Conference on Russia Papers. Baltic Defence College. https://www.rusconf.eu/wp-content/uploads/2025/02/Rusconf_25_veeb.pdf

Alternative Banking, Barter and Cryptocurrencies

SWIFT is the primary global network for interbank messaging used in cross-border payments; when a country's banks are disconnected from SWIFT, it becomes nearly impossible for them to conduct international financial transactions, effectively isolating their financial systems from global commerce⁸³. In response, sanctioned states have developed alternative financial channels and messaging systems to bypass SWIFT. These include domestic platforms, bilateral banking links, and informal transfer mechanisms. Many also rely on banks in third-party countries that have not joined Western sanctions to settle payments indirectly⁸⁴.

Iranian banks were removed from SWIFT in 2012 and again in 2019, prompting Tehran to shift toward bilateral arrangements, state-linked currency exchange houses, and banks in sympathetic countries to maintain access to global payments outside of SWIFT⁸⁵. Iran also utilized Hawala networks, a centuries-old informal banking system based on trust and personal connections, to move funds internationally without formal documentation⁸⁶. In September 2019, Iran launched SEPAM, a domestic interbank messaging system that enables financial communication between Iranian banks independently of SWIFT⁸⁷. SEPAM was later linked to Russia's SPFS (System for Transfer of Financial Messages), enabling bilateral transactions insulated from Western surveillance or intervention⁸⁸.

Russia's exclusion from SWIFT in 2022 posed an immediate threat to its ability to make foreign payments and service external debt. While temporary workarounds through U.S.-licensed intermediaries like JP Morgan and Citigroup delayed default, these channels were soon closed. Moscow responded by scaling up SPFS, its domestic SWIFT alternative first developed after the 2014 Crimea sanctions. After February 2022, SPFS was expanded to connect with banks in "friendly states" abroad⁸⁹. To operationalize these alternatives, Russia deepened ties with sanctioned partners. VTB Bank opened a branch in Tehran as part of a broader push to link Russian and Iranian banking systems in a way that avoids SWIFT dependency⁹⁰. By late 2024, approximately 160 banks in 20 countries, including Iran and China, were connected to SPFS, forming the basis of a nascent alternative financial network⁹¹.

⁸³ Tan, H. (2022). *China, Russia develop alternatives to the SWIFT payment system*. Business Insider. <https://www.businessinsider.com/china-russia-alternative-swift-payment-cips-spfs-yuan-ruble-dollar-2022-4>

⁸⁴ Institute for Financial Integrity. (2024, novembre 26). *The sanctions evasion threat*. <https://finintegrity.org/the-sanctions-evasion-threat/>

⁸⁵ Ridgwell, H. (2023). *Russia copying Iran to evade Western sanctions, report claims*. Voice of America. <https://www.voanews.com/a/russia-copying-iran-to-evade-western-sanctions-report-claims/7125028.html>

⁸⁶ Omarov, K. A. (2018). *The economic fallout of exclusion of the Islamic Republic of Iran from the SWIFT international payment network*. CyberLeninka. <https://cyberleninka.ru/article/n/the-economic-fallout-of-exclusion-of-the-islamic-republic-of-iran-from-the-swift-international-payment-network/pdf>

⁸⁷ Yalcinkaya, A. (2021). *Economy policy of Iran against financial sanctions*. ResearchGate. https://www.researchgate.net/publication/356182206_Economy_Policy_of_Iran_Against_Financial_Sanctions

⁸⁸ Ibid.

⁸⁹ Bhala, R. (2022). *Waves of Russian Sanctions: American and Allied Measures, Indian and Chinese Responses, and Russian Countermeasures*. SSRN. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4394031

⁹⁰ Ridgwell, H. (2023). *Russia Copying Iran to Evade Western Sanctions, Report Claims*. Voice of America. <https://www.voanews.com/a/russia-copying-iran-to-evade-western-sanctions-report-claims/7125028.html>

⁹¹ Lewis Brisbois Bisgaard & Smith LLP. (2025). *Sanctions Risks for Foreign Financial Institutions That Join Russian Financial Messaging System SPFS*. <https://lewisbrisbois.com/newsroom/legal-alerts/sanctions-risks-for-foreign-financial-institutions-that-join-russian>

Domestically, Russia relied on tools developed after 2014, including the National Payment Card System (NSPK) and the MIR payment card network, to sustain consumer transactions after Visa and Mastercard exited the country. The IMF has warned that the proliferation of systems like SPFS, SEPAM, and CIPS could lead to a fragmented global payments landscape. Future competition between Western-aligned institutions and parallel infrastructures supported by Russia, China, and Iran may result in regional financial blocs incompatible with SWIFT or G20 norms⁹².

Non-dollar trade is another evasion strategy. Sanctioned countries increasingly avoid using the U.S. dollar in international trade, settling transactions in local currencies such as the Chinese renminbi or UAE dirhams to reduce exposure to U.S. financial oversight, as dollar payments typically pass through American banks where sanctions are enforced. Barter deals provide a further workaround, where goods or services are exchanged directly without money, bypassing formal banking systems and major currencies; Iran has used oil-for-goods swaps, and Russia proposed barter trade involving car parts and gas turbines in exchange for steel and metals⁹³. Iran has also used rupees from Indian oil payments to buy Indian goods and shifted oil revenues into gold through schemes involving Turkish banks and fake invoices⁹⁴, while Russia mirrored these tactics by selling gold to buyers in non-sanctioning states like the UAE, Turkey, and China to avoid dollar-based channels after Western sanctions⁹⁵.

Cryptocurrencies have become a growing tool for sanctions evasion, as their decentralized, pseudonymous nature allows actors to bypass traditional financial infrastructure. Iran pioneered the large-scale use of cryptocurrency to counter sanctions, legalizing crypto mining and leveraging subsidized electricity to produce Bitcoin for international trade, while its Central Bank authorized using domestically mined crypto to pay for imports, building a parallel payment infrastructure outside Western control. Following these footsteps, Russia copied Iran's model by reversing its initial restrictions on crypto use after the 2022 invasion of Ukraine, actively supporting crypto mining, encouraging digital assets for cross-border payments, and developing similar tools to obscure digital transactions⁹⁶.

⁹² Klehr, J. (2023). *(Swift) Sanctions and the Rise of Parallel Payment Systems: A Qualitative Study of Financial Infrastructure and Power Dynamics in Times of FinTech* (Bachelor's thesis, University of Gothenburg). <https://gupea.ub.gu.se/bitstream/handle/2077/78672/Klehr%2C%20Jacqueline.pdf?sequence=1&isAllowed=y>

⁹³ Keatinge, T. (2023). *Developing Bad Habits: What Russia Might Learn from Iran's Sanctions Evasion*. Royal United Services Institute. <https://static.rusi.org/developing-bad-habits-what-russia-might-learn-from-irans-sanctions-evasion.pdf>

⁹⁴ Verma, N. (2019). *Exclusive: Indian Refiners Pay for Iranian Oil in Rupees - UCO Bank Executive*. Reuters. <https://www.reuters.com/article/world/exclusive-indian-refiners-pay-for-iranian-oil-in-rupees-uco-bank-executive-idUSKCN1P21XE> Friedman, U. (2018). *The Iran-Turkey Gold Trade That Could Have Undermined Sanctions*. The Atlantic. <https://www.theatlantic.com/international/archive/2018/01/iran-turkey-gold-sanctions-nuclear-zarrab-atilla/549665/>

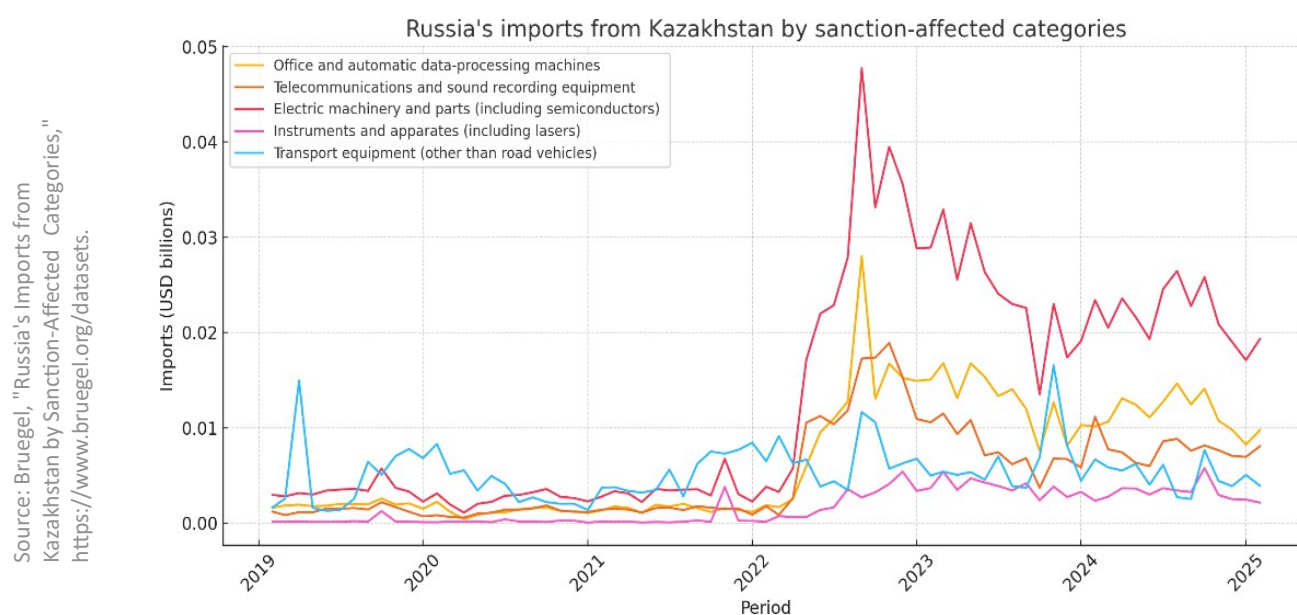
⁹⁵ Reuters. (2023). *Russia With Gold: UAE Cashes as Sanctions Bite*. <https://www.reuters.com/markets/russia-with-gold-uae-cashes-sanctions-bite-2023-05-25/>

⁹⁶ Wright, S. (2025). *The Evolution of Sanctions Evasion: How Cryptocurrency Is the New Game in Evading Sanction and How to Stop It*. International Journal of Law, Ethics, and Technology. <https://www.ijlet.org/wp-content/uploads/2025/01/3.1.1.pdf>

Trade Triangulation

Trade triangulation is a method used to disguise the true origin or destination of goods subject to sanctions, where sanctioned entities reroute transactions through one or more intermediary countries to hide their involvement behind re-exports from apparently legitimate third-party actors⁹⁷. This method relies on deceptive documentation, including falsified invoices, vague cargo descriptions, or illicit reuse of export licenses, to obscure the real end user⁹⁸. Enforcement agencies highlight indirect shipping routes, unscheduled detours, or third-country ports as red flags for triangulation attempts⁹⁹.

Iran has long used third-country trade routes to evade sanctions, with procurement agents diverting restricted goods through the UAE, Malaysia, Hong Kong, Singapore, and parts of Europe, including a case where a known smuggler told undercover agents that fighter jet parts for Iran were rerouted through another country¹⁰⁰. Turkey acted as a transshipment point by secretly sending Israeli-made capacitors to Iran via the UAE in 2017¹⁰¹. Iran used shell companies in Asia to acquire restricted technology like U.S. electronic components that were rerouted to military recipients¹⁰².



⁹⁷ Keatinge, T. (2023). *Developing Bad Habits: What Russia Might Learn from Iran's Sanctions Evasion*. Royal United Services Institute. <https://static.rusi.org/developing-bad-habits-what-russia-might-learn-from-irans-sanctions-evasion.pdf>

⁹⁸ Institute for Financial Integrity. (2024). *The Sanctions Evasion Threat*. <https://finintegrity.org/the-sanctions-evasion-threat/>

⁹⁹ Moody's Analytics. (2022). *Evading Sanctions Through Deceptive Shipping Practices*. <https://www.moody's.com/web/en/us/kyc/resources/insights/evading-sanctions-through-deceptive-shipping-practices.html> ¹⁰⁰ Levitt, M. (2010). *Giving Teeth to the Iran Sanctions: Targeting Re-Export Loopholes*. The Washington Institute. <https://www.washingtoninstitute.org/policy-analysis/giving-teeth-iran-sanctions-targeting-re-export-loop-holes>

¹⁰¹ Middle East Monitor. (2018). *UN Probes Turkey's Transfer of Israel Equipment to Iran*. <https://www.middleeastmonitor.com/20180517-un-probes-turkeys-transfer-of-israel-equipment-to-iran/>

¹⁰² Albright, D., Brannan, P., & Stricker, A. S. (2010). *Middleman Arrested for Allegedly Directing Malaysia-Based Iranian Illicit Procurement Scheme*. Institute for Science and International Security. https://isis-online.org/uploads/isis-reports/documents/Malaysia_middleman_16Feb2010.pdf

Since the Ukraine invasion, Russia has mirrored Iran's methods by using non-sanctioning countries, including the UAE, Turkey, Kazakhstan, Kyrgyzstan, Armenia, China, Hong Kong, India, and Serbia, to re-export high-tech and dual-use goods, with parallel imports and shadow traders supplying chips, electronics, and machinery to maintain Russia's military-industrial supply chains despite Western sanctions¹⁰³. Armenia's exports to Russia tripled in 2022 to \$2.4 billion and rose another 43% in 2023 to \$3.4 billion, with over 90% of its electrical machinery destined for Russia¹⁰⁴. The UAE transferred embargoed chips, industrial tools, and electronics to Russia¹⁰⁵.

The key differences in financial and trade sector adaptations between Russia and Iran lie in both scale and strategy: Iran has developed a long-standing, decentralized, and flexible network that relies on covert methods and barter, whereas Russia, facing sanctions more recently, is building a more centralized and formal system combining official channels with selective covert tactics inspired by Iran's model.

5. Oil Without Borders

Concealment of Shipping Routes: Dark Shipping

AIS (Automatic Identification System) is a maritime safety protocol that transmits a ship's position, speed, and heading to nearby vessels and coastal authorities to manage traffic and prevent collisions¹⁰⁶. Dark shipping refers to the practice of disabling AIS transceivers to avoid detection, a tactic that has sharply increased in response to Western sanctions on oil exports from Iran, Syria, North Korea, Venezuela, and Russia¹⁰⁷. AIS spoofing is an advanced method in which vessels transmit false GPS coordinates to disguise their actual location or generate "ghost" signals, enabling sanctioned tankers to appear compliant while conducting illicit transfers¹⁰⁸.

Iranian tankers frequently disable AIS transceivers to covertly transport crude oil, particularly in regions with limited regulatory oversight such as the Persian Gulf. A notable case was the dark ship Roma (IMO: 9182291), suspected of carrying Iranian oil, which loaded crude from Kharg Island while its AIS was off; in 2023, it operated over 40% of the

¹⁰³ Reuters. (2023). *Turkey Appears to Halt Transit of Sanctioned Goods to Russia - Kommersant*. <https://www.reuters.com/article/world/media-turkey-appears-to-halt-transit-of-sanctioned-goods-to-russia-kommersant-idUSL8N35I14O/>

¹⁰⁴ Harvard International Review. (2025). *Fortune Hunting: Russia and Sanctions Evasion*. <https://hir.harvard.edu/fortune-hunting-russia-and-sanctions-evasion/>

¹⁰⁵ Cornwell, A. (2024). *U.S., Allies Press UAE Over Russia Trade, Sanctions*. Reuters. <https://www.reuters.com/world/us-allies-press-uae-over-russia-trade-sanctions-2024-05-01/>

¹⁰⁶ NATO Shipping Centre. (2021). *AIS (Automatic Identification System) Overview*. <https://shipping.nato.int/nsc/operations/news/2021/ais-automatic-identification-system-overview>

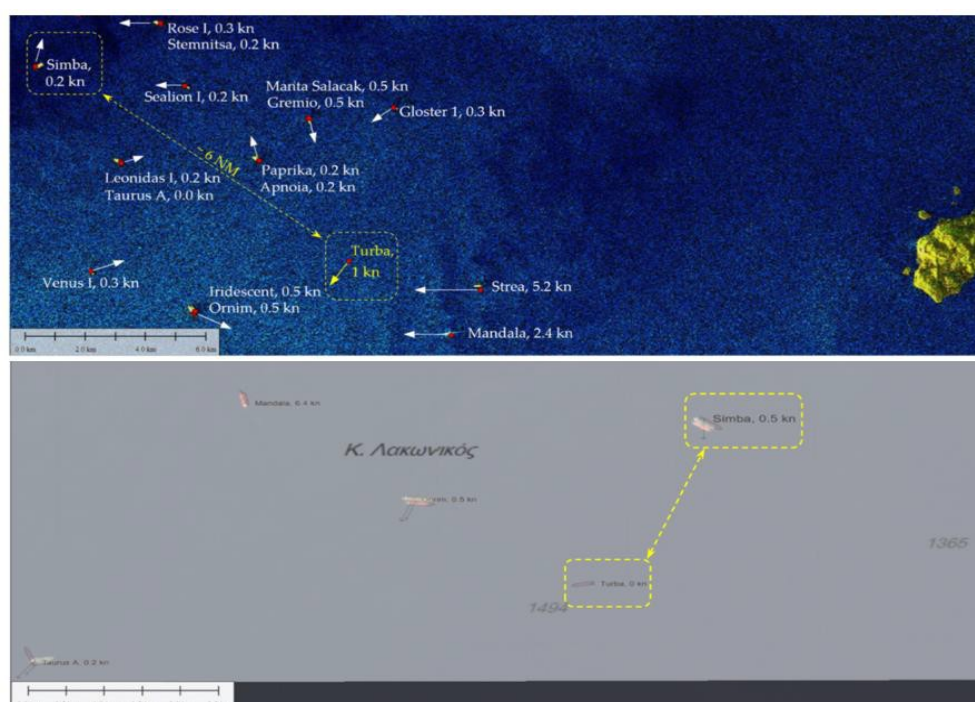
¹⁰⁷ Fernández-Villaverde, J., Li, Y., Xu, L., & Zanetti, F. (2025). *The (Un)Intended Consequences of Oil Sanctions and Dark Shipping*. University of Pennsylvania. https://www.sas.upenn.edu/~jesusfv/Dark_Shipping.pdf

¹⁰⁸ Bloomberg News. (2023). *Russian Oil Exports: Two Tankers Caught Spoofing Tracking Systems*. <https://www.bloomberg.com/news/articles/2023-09-27/russian-oil-exports-two-tankers-caught-spoofing-tracking-systems>

time without AIS. Geospatial analysis revealed high levels of Iranian dark shipping near the Strait of Hormuz before 2022, including frequent AIS deactivations. From early 2022, much of this activity transitioned to supporting Russian oil exports, as vessels formerly used by Iran were diverted by more lucrative Russian shipments. From 2017 to 2023, Iran played a major role in the average 9.3 million metric tons of crude oil transported monthly by dark tankers, with China absorbing a large share, especially after the U.S. withdrawal from the JCPOA in 2018¹⁰⁹. Another documented case of spoofing involved the Iranian tanker M/T Humanity, which impersonated another vessel (M/T Lubov) to transfer Iranian crude covertly in the Persian Gulf¹¹⁰.

Following sanctions on Russian oil in 2022 and the EU's \$60 price cap, covert maritime activity increased around Russian export terminals such as Novorossiysk and Ust-Luga. These were marked by AIS transmission gaps, used systematically to evade detection¹¹¹. Russia has increasingly employed electronic warfare tactics such as GPS jamming and AIS spoofing, particularly in the Baltic and Black Seas, to obscure both military and commercial vessel movements¹¹². A clear example is the Russian-linked tanker Turba, which falsified its AIS coordinates while satellite imagery showed it six nautical miles from the claimed location, confirming deliberate spoofing¹¹³.

Source: MDPI, SAR image from 19 September 2023 and optical image from 20 September 2023 showing the AIS spoofing of the tanker Turba during an STS operation in a busy area, <https://www.mdpi.com/2077-1312/12/1/6>.



¹⁰⁹ Yalcinkaya, A., op. cit.

¹¹⁰ Northwestern Journal of International Law and Business. (n.d.). *Northwestern Journal of International Law and Business*. Northwestern Pritzker School of Law. <https://scholarlycommons.law.northwestern.edu/njilb/>

¹¹¹ Yalcinkaya, A., op. cit.

¹¹² Angelov, G. A. (2023). *Suspected Russian GPS Jamming Risks Fresh Dangers in Black Sea Region*. Radio Free Europe/Radio Liberty. <https://www.rferl.org/a/russia-gps-jamming-black-sea-romania-bulgaria-ukraine/32655397.html>
Risk Intelligence. (2024). *Maritime Dangers of GPS/AIS Spoofing and Jamming in the Baltic Sea*. <https://www.riskintelligence.eu/analyst-briefings/maritime-dangers-of-gps/ais-spoofing-and-jamming-in-the-baltic-sea/>

¹¹³ MDPI. (2024). *AIS Data Manipulation in the Illicit Global Oil Trade*. *Journal of Marine Science and Engineering*, 12(1), 6. <https://www.mdpi.com/2077-1312/12/1/6>

In parallel, Russia built a “ghost fleet” to bypass maritime sanctions, replicating Iran’s long-standing practice. By mid-2024, it included over 400 crude and 200 product tankers, about 20% of global crude and 7% of product tanker fleets, carrying over 70% of Russia’s oil exports and contributing to a 41% rise in oil and gas revenues during the first half of 2024¹¹⁴. This fleet expansion followed three key strategies: transferring tankers from Sovcomflot to foreign shell firms, acquiring aging vessels on the global market, and investing \$8.5 billion in tankers near decommissioning age. However, the age and condition of these ships raise major safety and compliance concerns, as many operate without proper insurance, classification, or oversight, increasing the risk of oil spills, collisions, and environmental damage, particularly in high-traffic or ecologically sensitive maritime areas¹¹⁵.

Manipulation of Cargo: Ship-to-ship Transfer e Blending Oil

Ship-to-ship (STS) transfer involves directly moving liquid cargo such as crude oil, refined products, chemicals, or liquefied gas between two tankers at sea or in port¹¹⁶. While often legitimate, STS is also used in illicit trade to obscure the true origin of oil, especially during sanctions evasion. A related method is crude blending, where sanctioned oil is mixed with other grades to hinder tracking and identification.

Iran systematically uses STS transfers to circumvent sanctions, often in international waters and while AIS is deactivated. These operations take place near areas with limited oversight such as the Persian Gulf, Gibraltar, and West Africa¹¹⁷. A case study of the REMY (IMO: 9247431) illustrates this: the vessel went dark in February 2023 and likely conducted a covert transfer with the sanctioned SONIA I (IMO: 9357365), as confirmed by satellite imagery¹¹⁸. Iran enhances the credibility of false origin claims by conducting STS operations near countries with chemically similar crude, such as Iraq, and only reactivating AIS afterward¹¹⁹. It also blends its crude with Iraqi grades or uses shared offshore storage, followed by relabeling under third-country documentation, making lab detection difficult¹²⁰.

Since the 2022 oil embargo and price cap, Russia has similarly escalated the use of STS transfers to bypass sanctions. These transfers, often involving its shadow fleet, are conducted in international waters to obscure cargo origin. Nearly two-thirds of global STS activity is now linked to Russian operations. A notable concentration of STS transfers occurs

¹¹⁴ Jensen, B. (2025). *How to Exorcise Russia’s Ghost Fleet*. Center for Strategic and International Studies. <https://www.csis.org/analysis/how-exorcise-russias-ghost-fleet>

¹¹⁵ Braw, E. (2024). *The Threats Posed by the Global Shadow Fleet—and How to Stop It*. Atlantic Council. <https://www.atlanticcouncil.org/in-depth-research-reports/report/the-threats-posed-by-the-global-shadow-fleet-and-how-to-stop-it/#environmental-damage>

¹¹⁶ Skuld. (2020). *Ship to Ship Transfer Safety*. <https://www.skuld.com/topics/cargo/liquid-bulk/ship-to-ship-transfer-safety/>

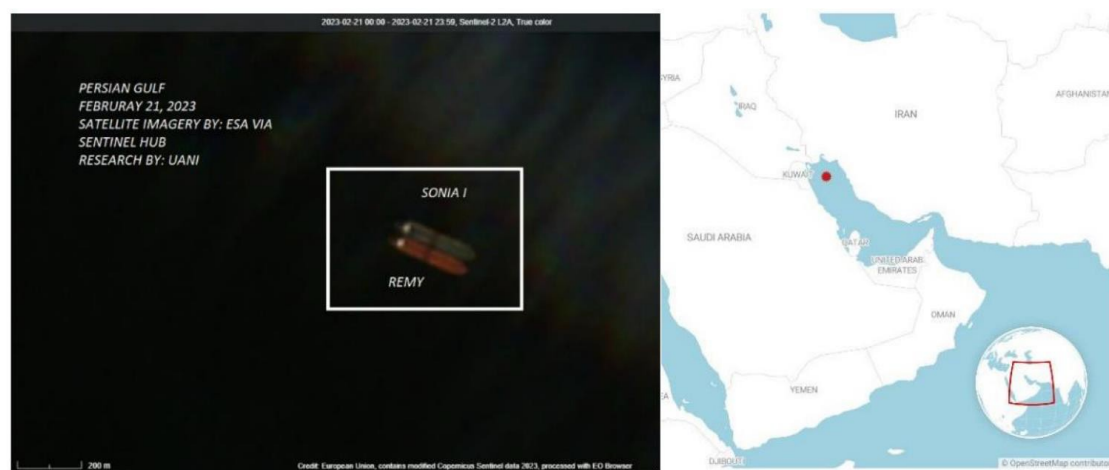
¹¹⁷ Fernández-Villaverde, J., Li, Y., Xu, L., & Zanetti, F., op. cit.

¹¹⁸ United Against Nuclear Iran. (2023). *February 2023 Iran Tanker Tracker*. <https://www.unitedagainstinucleariran.com/blog/february-2023-iran-tanker-tracker>

¹¹⁹ Yeshiva University. (2019). *The Crude Truth: Exploring Oil Sanctions Evasion and the Urgent Need for Enhanced Enforcement Measures*. <https://repository.yu.edu/bitstreams/bce0eae-c233-4ec4-a319-c0162ddf226b/download>

¹²⁰ Erport, Y., & Fadlon, T. (2023). *Economic Maneuvering: How States Evade Economic Sanctions. Strategic Assessment: A Multidisciplinary Journal on National Security*, 26(2), 90–109. Institute for National Security Studies. https://www.inss.org.il/wp-content/uploads/2023/09/Adkan26.2_Eng_4.pdf

Satellite imagery of REMY engaged in a STS transfer of Iranian crude oil with SONIA I (Source: Sentinel Hub)



near Russian ports in the Baltic and Black Seas, where around 60% of tankers involved belong to the shadow fleet, while 84% of receiving ships are not, indicating a scheme to pass oil to less conspicuous carriers¹²¹. These transfers are often conducted during AIS blackouts or with spoofed coordinates, for example, vessels appearing near Japan while loading at Kozmino port. Analysts track synchronized AIS gaps and geographic proximity to identify likely STS activity near chokepoints such as Gibraltar and the Gulf of Guinea¹²². Russia also rebrands its oil through STS transfers to Western-insured ships. In February 2024, uninsured Russian tankers off the coast of Romania transferred crude to the Liberian FSU New Trust, echoing methods used previously by the New Legend¹²³. An additional strategy involves blending Russian crude with other national grades. If the Russian portion is below 50%, it can be labeled under different national origins (e.g., Lithuanian or Turkmen), allowing it to enter global markets legally¹²⁴.

Identity Alteration: Flag of Convenience e Vessel Identity Changes

UNCLOS Article 91 requires each vessel to sail under a single flag and nationality, but the concept of a “genuine link” between ship and flag is vaguely defined and rarely enforced, enabling widespread use of flags of convenience (FoC) with minimal oversight¹²⁵. Article 94 intended to ensure flag state jurisdiction, control, and compliance with safety and environmental rules, but the absence of precise legal definitions and enforcement mechanisms has allowed vessels to register under states with no substantive connection, undermining maritime governance¹²⁶.

¹²¹ Hilgenstock, B., Hrybanovskii, O., & Kravtsev, A., op. cit.

¹²² Fernández-Villaverde, J., Li, Y., Xu, L., & Zanetti, F., op. cit.

¹²³ Hilgenstock, B., Hrybanovskii, O., & Kravtsev, A., op. cit.

¹²⁴ Erport, Y., & Fadlon, T. (2023). *Economic Maneuvering: How States Evade Economic Sanctions*. Strategic Assessment: A Multidisciplinary Journal on National Security, 26(2), 90–109. Institute for National Security Studies. https://www.inss.org.il/wp-content/uploads/2023/09/Adkan26.2_Eng_4.pdf

¹²⁵ United Nations Conference on Trade and Development. (2019). *Review of Maritime Transport 2019: Chapter 5 - Legal Issues and Regulatory Developments*. UNCTAD. https://unctad.org/system/files/official-document/ditctedinf2019d11_en.pdf

¹²⁶ Jus Mundi. (n.d.). *Genuine and Effective Link*. <https://jusmundi.com/en/document/publication/en-genuine-and-effective-link>

Exploiting this gap, vessels involved in sanctions evasion register under FoCs like Panama, Dominican Republic, and Sierra Leone, obscuring ownership and nationality while combining flag-switching with identity-masking tactics such as changing names, ownership, and registration details¹²⁷. Iran began reflagging tankers under Cypriot, Maltese, and other opaque registries starting in 2008, employing renaming, repainting, and false origin declarations to maintain oil exports amid sanctions¹²⁸.

Russia has copied these strategies, relying on permissive flags from Panama, Liberia, Gabon, and Marshall Islands, with frequent corporate restructuring, renaming, and reflagging to sustain operations and conceal ownership, sometimes altering MMSI numbers, adopting fake IMO numbers, or swapping data to evade detection¹²⁹. The Pioneer and Metagas Everest cases show quick reflagging under sanctions pressure, with Metagas Everest shifting from Palau to Curaçao, and when U.S. measures targeted Liberian and Marshall Islands flags, Russian-linked ships adapted by using Gabon and Panama registrations¹³⁰. Approximately 90 tankers once operated by Sovcomflot were transferred to UAE-based firms, retaining indirect Russian links while continuing commercial operations under restructured identities¹³¹.

The key differences between Russia and Iran in energy sanctions evasion lie in experience, scale, tactics, and market dynamics: Iran has long-established, smaller-scale, and localized methods refined over decades of sanctions, while Russia's approach is more recent, larger in scope, and incorporates advanced tactics like AIS spoofing and broader STS transfers; Russia benefits from a price cap that allows hybrid methods, whereas Iran's oil faces a total ban, and Russia's vast discounted supply is increasingly outcompeting Iran's traditional clandestine markets.

6. What Sanctions Have (and Haven't) Achieved

This study showed how Russia copied and adapted the techniques used by Iran to circumvent international sanctions and explored the differences between the two approaches. The analysis that followed evaluated whether these sanctions truly limited Russia's military and economic capabilities or if the evasion mechanisms modeled on Iran's experiences undermined their impact. Politically, while the sanctions achieved significant compliance within the sanctioning states and served to isolate Russia in the Euro-Atlantic sphere, they did not fully achieve comprehensive global isolation.

¹²⁷ Nguyen, T. (2023). The Challenges of Dark Ships to the Safety and Security of Commercial Shipping and the Way Forward. *Asia-Pacific Journal of Ocean Law and Policy*, 8(2), 310–335. https://brill.com/view/journals/apoc/8/2/article-p310_007.xml?language=en

¹²⁸ Sarcinschi, A., & Bogzeanu, C. (Eds.). (2012). *Strategies XXI: The Complex and Dynamic Nature of the Security Environment*. "Carol I" National Defence University Publishing House. https://cssas.unap.ro/en/pdf_books/conference_2012.pdf Katz, N. (2023). *The Crude Truth: Exploring Oil Sanctions Evasion and the Urgent Need for Comprehensive Data* [Unpublished undergraduate honors thesis]. Yeshiva University. <https://repository.yu.edu/bitstreams/bce0eae-c233-4ec4-a319-c0162ddf226b/download>

¹²⁹ Hilgenstock, B., Hrybanovskii, O., & Kravtsev, A., op. cit.

¹³⁰ Nilsen, A. (2024). *Sanctions and the Shadow Fleet: Assessing the Effectiveness of Maritime Sanctions Enforcement* [Master's thesis, Norwegian University of Science and Technology]. NTNU Open. <https://ntnuopen.ntnu.no/ntnu-xmlui/handle/11250/3176483>

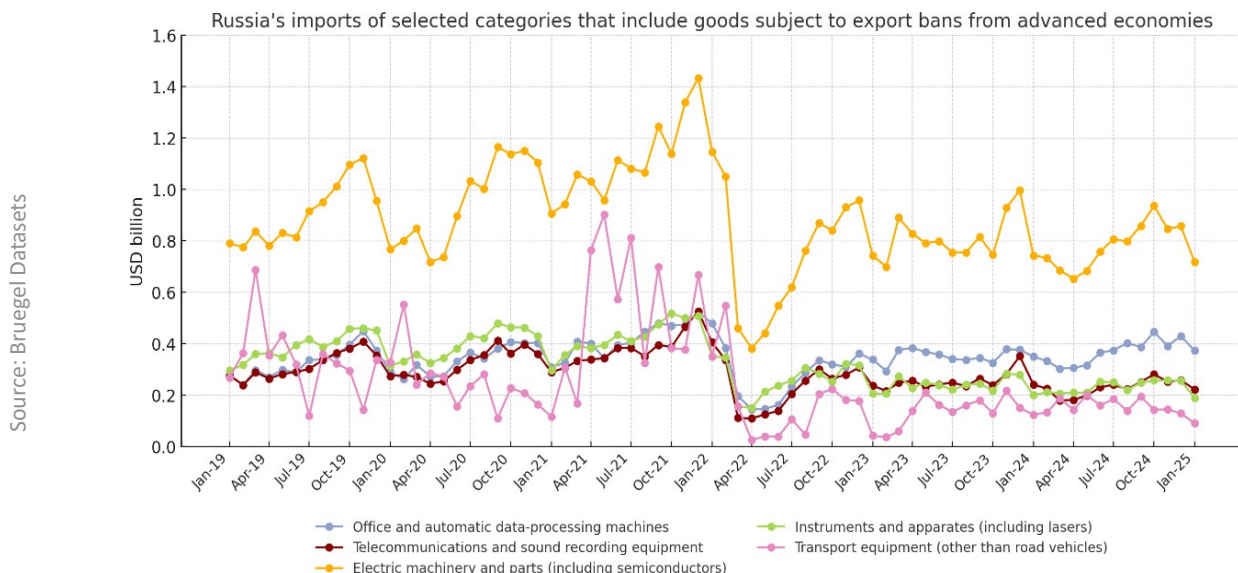
¹³¹ Hilgenstock, B., Hrybanovskii, O., & Kravtsev, A., op. cit.

Many countries chose to continue engaging with Moscow, motivated by aspirations for strategic autonomy or resistance to Western dominance. This limited reach underscored the dynamics of a multipolar world in which Russia continued to exercise influence. The participation of over 20 heads of state and government at the May 9, 2025 Victory Day celebrations in Moscow, though representing a small segment of the world's leadership, demonstrated that despite Western efforts to curtail Russia's international relations, its global partnerships remained resilient.

Technological Sector

In the technological sector, Western sanctions have significantly restricted Russia's access to essential components such as microchips, optics, and precision tools, resulting in slower military modernization and higher procurement costs, forcing reliance on outdated systems like Soviet-era T-55 tanks ¹³². Russia has increasingly relied on third-country intermediaries, with an estimated 60% of Western components entering through China, including CNC precision machine tools that still contain U.S. or Japanese chips¹³³

In response to sanctions, Moscow's efforts at domestic substitution and parallel imports have mitigated some early disruptions, but they have not been sufficient to ensure access to advanced microelectronics essential for next-generation weapons¹³⁴. Trade data indicate that while initial sanctions temporarily curtailed the export of dual-use technologies to Russia, over time, Russia has managed to circumvent these restrictions by employing various evasion strategies detailed in this study, thereby restoring a significant portion of these critical imports.



¹³² Ruth, O. (2025). *The Impact of Sanctions and Alliances on Russian Military Capabilities*. Royal United Services Institute. <https://www.rusi.org/explore-our-research/publications/commentary/impact-sanctions-and-alliances-russian-military-capabilities>

¹³³ Payne, J. (2024). *Ukraine says China is key route for foreign tech in Russian weapons*. Reuters. <https://www.reuters.com/world/europe/ukraine-says-china-is-key-route-foreign-tech-russian-weapons-2024-09-24/> Reuters. (2024). *The Western industrial components rebuilding Russia's military*. <https://www.reuters.com/world/europe/western-industrial-components-rebuilding-russias-military-2024-08-16/>

¹³⁴ Gorenburg, D., Bendett, S., Gause, K., Luzin, P., Rosa-Hernandez, G. I., Schwartz, P., & Wishnick, E. (2024). *Crafting the Russian War Economy: The Effects of Export Controls on Russia's Defense Industrial Production*. CNA. <https://www.cna.org/reports/2024/10/crafting-the-russian-war-economy.pdf>

Despite intensified sanctions enforcement, loopholes persist, as demonstrated by the 2023 shipment of a high-end semiconductor etching machine to Russia via Belarus¹³⁵, and Western-made components have continued to appear in Russian weaponry, with U.S.-made chips from Texas Instruments, Intel, AMD, and Infineon found in captured Kalibr and Iskander missiles¹³⁶, as well as a Ukraine-led study indicating that 95% of foreign parts in destroyed Russian weapons were of NATO origin, with 72% from U.S. firms¹³⁷.

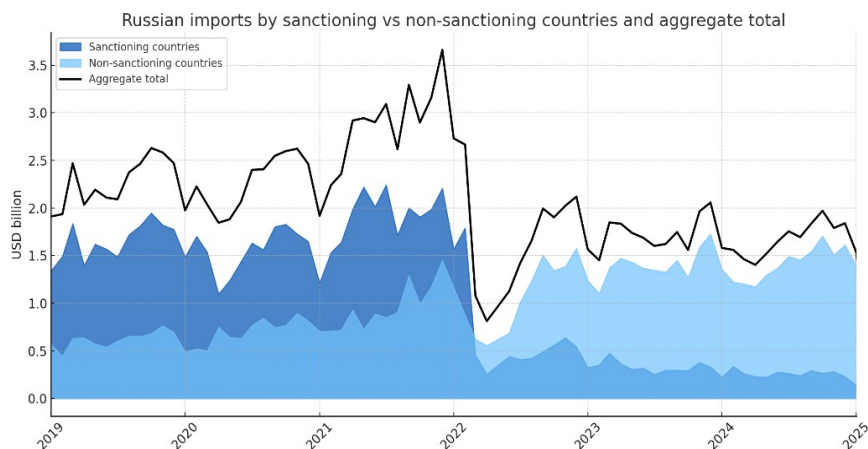
The technological quality of Russia's equipment has broadly declined, with the switch to cheaper, less reliable components. For instance, Geran-2 (Shahed-136) drones have begun using lower-quality Chinese motors after losing access to Western parts, resulting in higher crash rates and reinforcing assessments by Western and Ukrainian military analysts linking quality deterioration to sanctions pressure¹³⁸.

Overall, these measures have not fully neutralized the negative impact of sanctions, which have effectively slowed Russia's technological modernization, degraded production quality, and weakened its ability to maintain high-quality production standards, fulfilling the original intent of complicating and undermining its technological advancement.

Financial and Trade Sector

In the financial and trade sector, Western sanctions aimed at severely limiting Russia's international commercial operations by targeting its financial infrastructure, including measures like SWIFT exclusions, and by constraining its export capacities. Following the suspension of official Russian trade statistics in 2022, this analysis relies on Bruegel's dataset, which compiles monthly trade data from 38 countries representing about 80% of Russia's 2019 trade volume, allowing for a partial reconstruction of trade flows focused on imports alone. In response to these constraints, Russia adapted by diversifying its import sources and using intermediaries to reroute Western goods, which enabled it to recover a significant portion of lost imports within a year, though not fully restoring pre-invasion levels (*figure 1*).

figure 1
Source: Bruegel Datasets



¹³⁵ C4ADS. (2025). *Etch and Release*. <https://c4ads.org/commentary/etch-and-release/>

¹³⁶ Gauthier-Villars, D., Stecklow, S., Tamman, M., Grey, S., & Macaskill, A. (2022). *As Russian missiles struck Ukraine, Western tech still flowed*. Reuters. <https://www.reuters.com/investigates/special-report/ukraine-crisis-russia-missiles-chips/>

¹³⁷ Reuters. (2024). *Russia got components worth \$2.9 bln from West despite sanctions, Kyiv says*. <https://www.reuters.com/world/europe/russia-got-components-worth-29-bln-west-despite-sanctions-kyiv-says-2024-01-17/>

¹³⁸ Warrick, J., & Morgunov, S. (2024, December 5). *Far from the front lines, a spy war rages over Russian weapons*. The Washington Post. <https://www.washingtonpost.com/national-security/2024/12/05/russian-sanctions-weapons-ukraine-war/>

The economic pressure from sanctions has been compounded by war-related factors such as increased spending, labor shortages, and monetary expansion to cover budget deficits, all of which fueled inflation (*figure 2*). The Central Bank raised interest rates in an attempt to contain price increases, but inflation has remained high, further exacerbated by the weakening of the ruble, which increased the cost of imports and disrupted trade flows. While public spending has supported domestic demand, it has also intensified inflationary pressures, with the depreciation of the ruble making foreign goods more expensive. Sanctions have also driven up operational costs for Russian firms, restricted access to imported goods and technologies, and frozen approximately \$350 billion in Russian foreign reserves, depriving the Central Bank of its key financial buffer and forcing aggressive interest rate hikes¹³⁹ (*figure 3*).

figure 2
Source: Investing.com

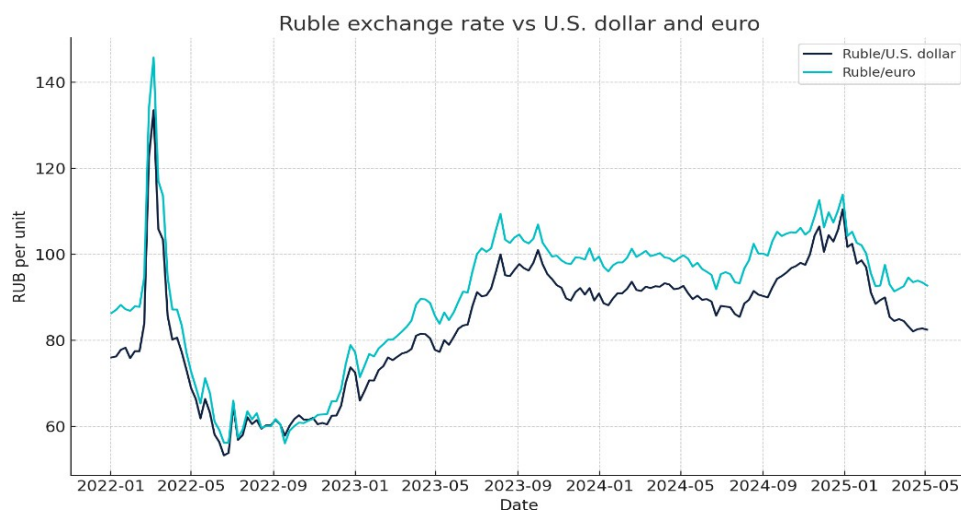
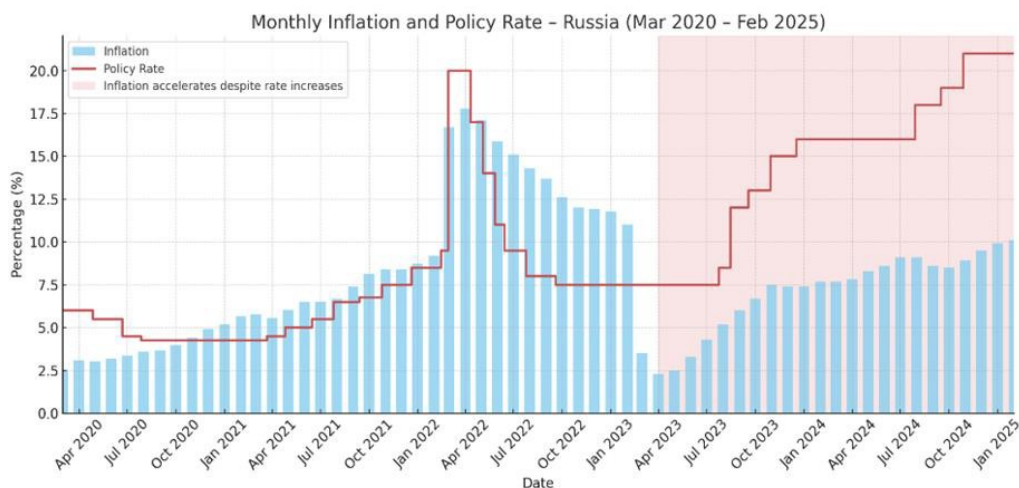
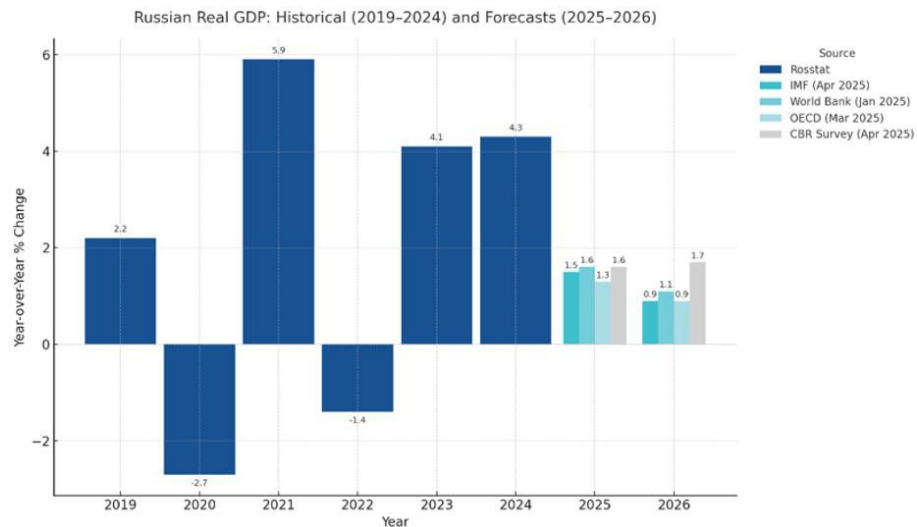


figure 3
Source: Central Bank of Russia (CBR)



¹³⁹ Hilgenstock, B., Pavytska, Y., & Talalaievskiy, M. (2025, April). *Russia Chartbook: Lower oil prices are becoming a problem at a time of accumulated vulnerabilities*. Kyiv School of Economics. https://kse.ua/wp-content/uploads/2025/04/Chartbook_April_2025.pdf

figure 4
Source: Kyiv School of Economics



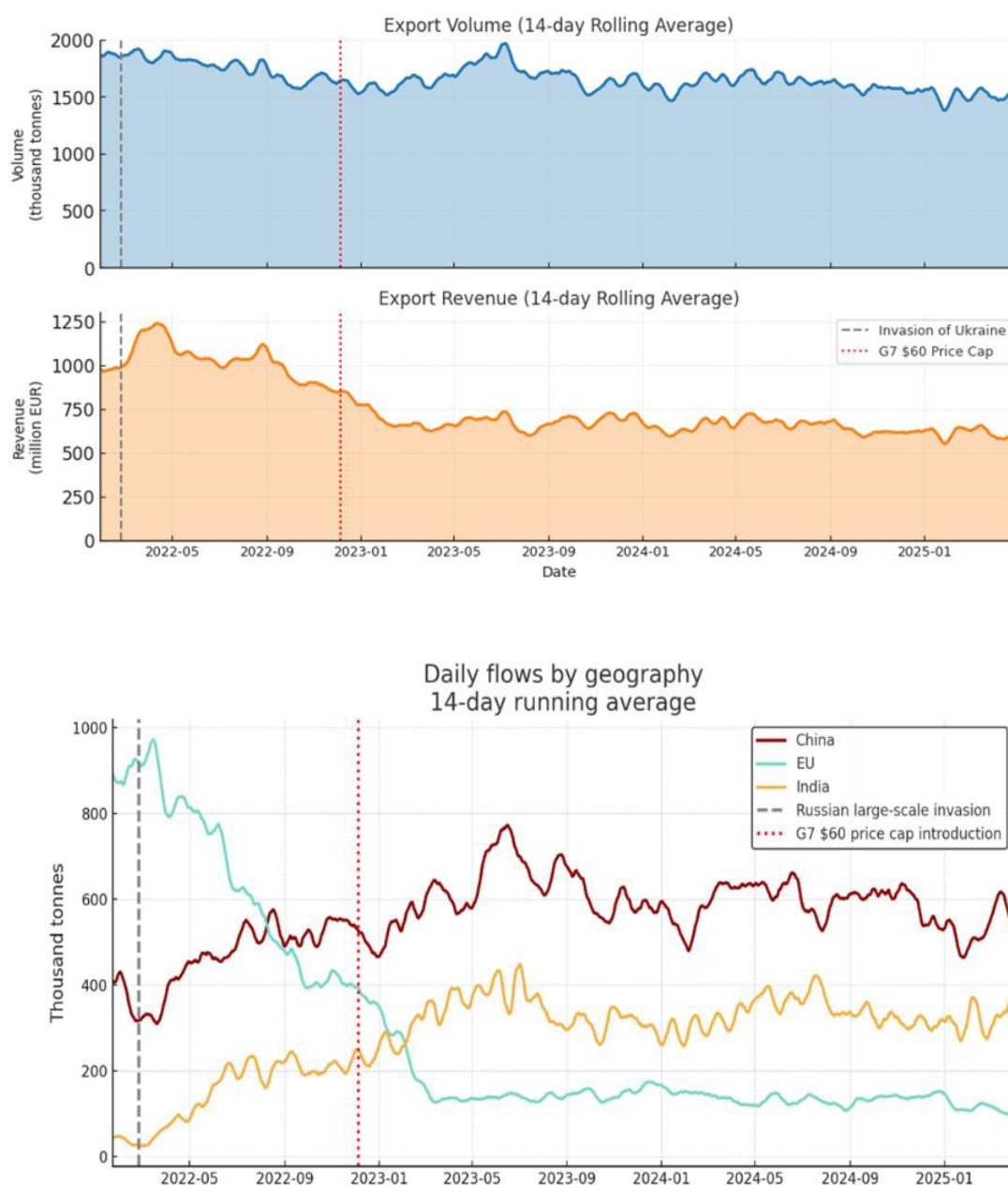
Although inflation slightly eased by 2025, it remained above the Central Bank's target, while economic growth slowed. After a period of strong expansion in 2024 driven by defense spending, GDP growth in early 2025 decelerated to between 1% and 2% as high interest rates and falling oil prices took their toll (*figure 4*). Western sanctions in the trade and financial sectors have been effective in exerting sustained pressure on the Russian economy, and by early 2025, several key economic indicators showed signs of deterioration. However, while sanctions are clearly impacting Russia's financial and trade capacities, it is the immense financial burden of sustaining the war that is causing the most severe damage, placing long-term pressure on the country's economic stability and compromising its future growth.

Energy Sector

Oil and gas revenues for Russia in 2024 amounted to approximately \$120 billion (compared to a total federal budget revenue of about \$397 billion), accounting for 30 per cent of the total, which marks a significant decline from the roughly 50 per cent averaged between 2011 and 2014, though hydrocarbons remain the primary source of state income¹⁴⁰. The European Union member states within the G7 had the most leverage to reduce the Kremlin's energy revenues, given their role as Russia's main customers at the outset of the invasion, and these countries rapidly moved to reduce imports of Russian fossil fuels, seeking to enhance energy security through supplier diversification and to weaken the Russian budget.

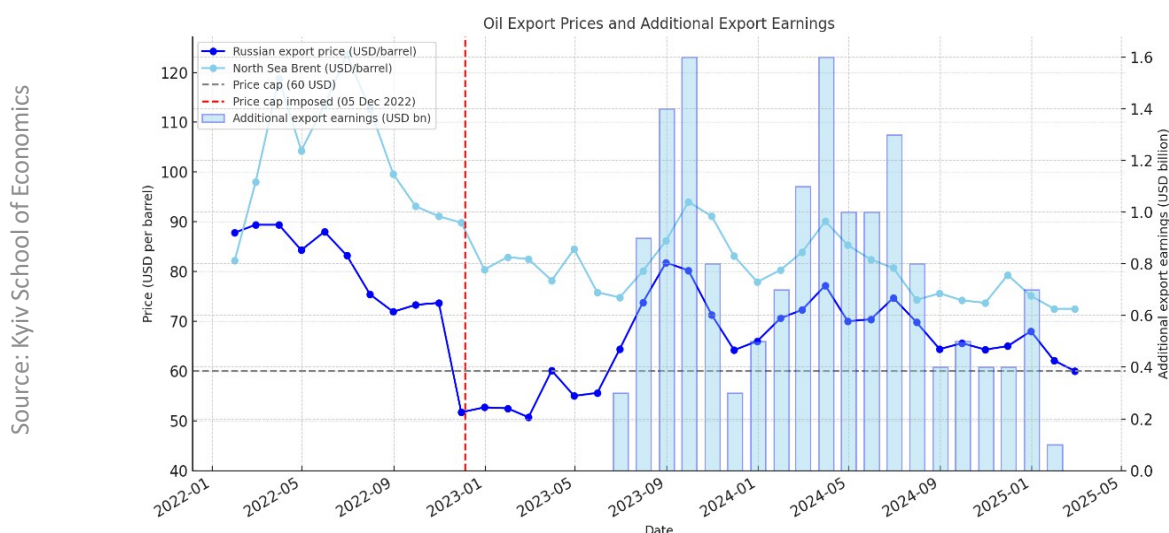
¹⁴⁰ Yermakov, V. (2025, February). *Fiscal Flex: Russia's oil and gas revenues in 2024*. Oxford Institute for Energy Studies. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2025/02/Comment-Fiscal-Flex.pdf>

To compensate for the sharp decline in European demand, Russia turned to other markets, especially China and India, the latter of which increased its daily imports from roughly 27,000 tonnes pre-invasion to about 362,000 tonnes by April 1, 2025, with a peak of approximately 449,000 tonnes around July 2, 2023¹⁴¹. However, while Russia succeeded in maintaining export volumes by shifting its market focus, it was forced to sell oil at discounted rates due to the stronger bargaining positions of its new buyers, resulting in overall revenue losses despite the redirection of trade.



¹⁴¹ Centre for Research on Energy and Clean Air. (2025, February 24). *Russia Fossil Tracker – Payments to Russia for fossil fuels since 24 February 2022*. <https://www.russiafossiltracker.com/>

On December 5, 2022, the Price Cap Coalition, which includes the EU, G7, and other partners, imposed a \$60 per barrel cap on Russian seaborne crude oil exports, aimed at reducing Russia's war funding capabilities while ensuring global energy stability by allowing exports below the price limit¹⁴². This cap initially proved effective, causing a sharp decline in Russian oil revenues, with daily losses reaching €180 million and a 14% annual fall in export income, but its impact diminished over time due to insufficient enforcement and monitoring, which allowed Russia to circumvent the cap through various means¹⁴³.



Tactics such as employing a large shadow fleet and refining Russian crude in countries with exemptions undermined restrictions and enabled revenue recovery during the second half of 2023. The profitability of these evasive strategies increased with rising oil prices, leading to a direct correlation between the price of oil and Russia's shadow fleet-generated revenues. While sanctions targeting these shadow operations have intensified, with U.S. designations in January, EU sanctions in its 15th and 16th packages, and continued UK efforts¹⁴⁴, the more recent declines in Russian export revenues are primarily attributable to falling global oil prices caused by reduced demand amid escalating trade tensions triggered by the Trump administration's policies.

Western sanctions on Russia's energy sector have achieved measurable progress in curbing revenue flows, yet they have struggled to sever them completely. Despite the introduction of the price cap and seaborne export bans, Russia has continued to adapt through evasion techniques, including the deployment of a shadow fleet, opaque shipping arrangements, and the redirection of exports to China and India. While the price cap

¹⁴² European Commission. (2022, December 3). *Il Consiglio adotta il nono pacchetto di sanzioni contro la Russia*. https://ec.europa.eu/commission/presscorner/detail/it/ip_22_7468

¹⁴³ Centre for Research on Energy and Clean Air. (2023, December). *One year of sanctions: Russia's oil export revenues cut by EUR 34 bn*. <https://energyandcleanair.org/publication/one-year-of-sanctions-russias-oil-export-revenues-cut-by-eur-34-bn/>

¹⁴⁴ Hilgenstock, B., Pavytska, Y., & Talalaievskiy, M. (2025, April). *Russia Chartbook: Lower Oil Prices Are Becoming a Problem at a Time of Accumulated Vulnerabilities*. Kyiv School of Economics. https://kse.ua/wp-content/uploads/2025/04/Chartbook_April_2025.pdf

represents an important tool in this strategy, its results have been partial, as Russia continues to earn revenue, albeit at lower margins. Even if Europe had maintained its purchases of Russian fuels, Moscow would have still sought alternative markets to sustain its war effort, making the reduction of European demand essential to weakening a crucial source of the Kremlin's income.

7. Conclusions

The analysis shows that Western sanctions have consolidated a united political and ideological front within the West against Russia, despite limited internal differences, particularly through NATO and the EU, yet they have failed to achieve comprehensive global isolation, as evidenced by Russia's sustained ties with non-Western powers like China and India and its active participation in BRICS.

While technological sanctions have slowed Russia's military modernization and degraded equipment quality, the country has counteracted many of these effects through third-country imports, domestic substitution, and external support. Financial and trade sanctions have created substantial pressure on Russia's economy, driving inflation, trade disruption, and rising costs, yet Moscow tried to stabilize its economic situation through adaptive responses and macroeconomic measures. However, despite these stabilizing efforts, there are clear signs that the Russian economy is beginning to suffer significantly, with mounting inflation, a weakening ruble, falling investment levels, and rising difficulties in maintaining sustainable trade flows. Energy sanctions forced Russia to redirect exports to alternative buyers like China and India, but losses were mitigated through discounted sales, shadow fleet tactics, and enforcement gaps, enabling sustained export volumes despite initial setbacks. Overall, while these evasion strategies have helped Russia to partially offset the immediate effects of sanctions, they have still imposed considerable costs on its economy and limited its strategic options, demonstrating the significant impact of the measures put in place by Western policymakers.

As this analysis has revealed, the near-identical sanctions strategies applied to both Russia and Iran have inadvertently pushed them towards closer cooperation. Facing essentially the same economic challenges, and with strikingly similar economic structures, the two countries have formed a pragmatic partnership driven by necessity rather than ideology. Iran benefits from Russia's geopolitical weight to counterbalance U.S.-led global pressures, while Russia relies on partners like Iran to mitigate its growing isolation. Western policies, by treating them as part of a single axis, have reinforced the perception of a united front, thereby encouraging further practical cooperation between the two.

To counter this dynamic, the West could reconsider its uniform approach and instead implement differentiated sanctions tailored to the specific vulnerabilities and priorities of Russia and Iran. By recognizing their distinct economic structures and geopolitical goals, policymakers could reduce their incentives to maintain a united front, highlighting and exploiting the fractures in their partnership. One option would be to offer Iran targeted

sanctions relief, such as limited oil export licenses or partial revival of the nuclear deal (JCPOA). Providing Tehran with attractive economic alternatives could prompt it to reassess its dependence on Moscow and move towards reintegration into global markets, potentially undermining their pragmatic alignment. Another approach involves disrupting the shadow markets where Russia and Iran increasingly cooperate. By selectively allowing Iranian oil exports or by boosting global oil supply to depress prices, the West could turn their shared economic interests into competition. This shift from cooperation to rivalry would erode the economic partnership that has thus far sustained their resilience.

Finally, a key point of divergence lies in their respective approaches to Israel. Russia maintains pragmatic and balanced relations with Israel, tolerating its military actions against Iranian targets in Syria, while Iran adopts a strongly hostile stance, supporting groups like Hezbollah and Hamas. Western actors could highlight Russia's reluctance to fully align with Iran's anti-Israel agenda, thereby deepening Tehran's mistrust and exposing the inherent fragility of their partnership.

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