

MODERNIZATION OF THE ARMAMENT OF THE BOLIVARIAN ARMED FORCES: RUSSIAN AND CHINESE MILITARY TECHNOLOGY TRANSFERS TO VENEZUELA BEFORE AND AFTER MADURO'S ASSUMPTION OF POWER

Rosa Hernandez Sanchez 

Central University of Venezuela
Caracas, Bolivarian Republic of Venezuela
Email: rosa.h.s.htj@fhe.ucv.ve

Original Scientific Article

Received: 10.02.2026. Accepted: 18.03.2026.

DOI: <https://doi.org/10.65932/military-studies-2026-2-1> UDC: 355.02:623.4](87)”20”

Abstract: Venezuela conducted the most ambitious military modernization in Latin America of the early twenty-first century, absorbing approximately 11 billion US dollars of Russian defense articles between 2001 and 2013 and becoming the largest buyer of Russian weapons in the Western Hemisphere. The aim of this article is to explain why an armament program of this magnitude proved strategically unsustainable, and to measure that unsustainability in a replicable way. The research applies a mixed methodological approach combining longitudinal analysis of arms-transfer data (SIPRI Arms Transfers Database, IISS Military Balance), comparative analysis of the pre-Maduro (2005–2013) and Maduro (2013–2025) periods, and a structured case study of Russian and Chinese transfer channels. The original contribution of the article is the Transferred-Capability Sustainability Index (TCSI), a five-dimension composite metric (financing continuity, maintenance autonomy, technology absorption, human capital retention, supplier commitment) that quantifies the degree to which an import-based modernization survives the interruption of its enabling conditions. Applied to Venezuela, the TCSI falls from 7.0/10 in the 2005–2013 period to 3.0/10 in the 2014–2025 period, a 57% decline. Key findings: deliveries of major conventional weapons collapsed to near zero after 2016; Venezuela's GDP contracted by more than 80% between 2013 and 2020, removing the fiscal basis of sustainment; by 2019 Russian specialist personnel had to be deployed to Venezuela simply to keep previously delivered equipment operational. The article concludes that the Venezuelan case demonstrates a generalizable proposition: arms-transfer-based modernization without absorption of maintenance, production, and training capacity produces capability that is rented rather than owned, and decays at the speed of the political relationship that financed it.

Keywords: *arms transfers, Venezuela, Russia, China, military modernization, technology absorption, sustainability of military capability, TCSI.*

INTRODUCTION

Between 2005 and 2013 the Bolivarian Republic of Venezuela executed a rearmament program without precedent in the modern history of Latin America. In less than a decade the country acquired 24 Su-30MK2 multirole fighters, approximately 50 trans-

port and attack helicopters, 100,000 AK-103 assault rifles, S-300VM long-range air-defense systems, T-72B1 main battle tanks and BMP-3 infantry fighting vehicles, financed by an oil boom and by Russian state credit estimated at 4 billion US dollars in the 2005–2008 window alone (Rouvinski, 2019; Herbst & Marczak, 2019; IISS, 2025). Total Russian

defense sales to Caracas in the 2001–2013 period reached approximately 11 billion US dollars, a figure that made Venezuela the single largest destination of Russian military technology in the Western Hemisphere (Seelke et al., 2022). In parallel, the People's Republic of China became Venezuela's largest bilateral creditor and a secondary but strategically distinctive arms supplier, delivering K-8W trainer aircraft, VN-4 armored vehicles and dual-use surveillance technology within a relationship that escalated formally from “strategic partnership” to “all-weather strategic partnership” by 2023 (Dominguez, 2024; Rendon & Fernandez, 2020; IISS, 2025).

A decade later, the material result of this program is largely inoperative. Deliveries of major conventional weapons to Venezuela fell to negligible levels after 2016 (SIPRI, 2025c). The national economy contracted by more than 80% between 2013 and 2020, and in 2024 remained less than half its 2013 size, with roughly 73% of the population in poverty and 7.9 million citizens — including a large share of the technically trained workforce — outside the country (Congressional Research Service, 2025; Weitzman & Huss, 2024). In March 2019 Russia deployed specialist military personnel to Venezuela for the explicit purpose of maintaining previously delivered equipment, and in April 2019 opened a helicopter training center near Caracas — interventions that constitute direct evidence that the recipient could no longer sustain its own inventory (Seelke et al., 2022). The planned Kalashnikov rifle factory, contracted in 2006 as the flagship technology-transfer component of the Russian relationship, remained unfinished more than a decade later amid documented corruption in its construction (Rouvinski, 2019; Rendon & Fernandez, 2020).

This trajectory poses the central research question of the article: under what conditions does an arms-import-based military modernization survive the interruption of the financial, political, and industrial conditions that enabled it — and how can the degree of

survival be measured? The Venezuelan case is analytically privileged for answering this question because the 2013 transfer of power from Hugo Chávez to Nicolás Maduro cleanly divides the program's life cycle into an acquisition phase conducted under conditions of fiscal abundance and a sustainment phase conducted under conditions of fiscal collapse, sanctions, and deepening authoritarianism (Corrales, 2020; Buxton, 2020; Duarte Villa, 2022).

The article tests three hypotheses. The first hypothesis (H1) holds that 2013 marks a structural rupture rather than a gradual inflection: the determinants, volume, and function of Russian and Chinese military technology transfers to Venezuela changed categorically between the Chávez and Maduro periods. The second hypothesis (H2) holds that after 2013 the function of the transfer relationship shifted from capability acquisition to regime survival — transfers of maintenance services, credit, and dual-use surveillance technology substituted for transfers of weapons platforms. The third hypothesis (H3) holds that the decisive variable in the program's failure was not sanctions pressure but absorption failure: Venezuela did not internalize the maintenance, production, and training capacities that would have converted imported platforms into sustainable national capability.

The original contribution of this article lies in the construction and first application of the Transferred-Capability Sustainability Index (TCSI), a five-dimension composite metric — financing continuity, maintenance and repair autonomy, technology absorption, human capital retention, and supplier commitment — that quantifies, on a 0–10 scale, the degree to which an arms-import-based modernization can survive the interruption of its enabling conditions. Unlike the descriptive literature on Russian–Venezuelan and Chinese–Venezuelan relations, which has documented the transfers themselves in detail (Cardozo Uzcátegui & Mijares, 2020; Borsner Herrera & Haluani, 2023; Bull & Rosales, 2026), the TCSI makes the

sustainability of a transferred arsenal an explicit, decomposable, and comparable quantity, applicable to other import-dependent recipients such as Algeria, Myanmar, or Serbia.

The article proceeds in six parts. The literature review situates the Venezuelan case within scholarship on arms-transfer determinants, technology absorption, and authoritarian civil–military relations, and the methodology section specifies data sources and the construction of the TCSI. The research results section presents the empirical findings organized by hypothesis, including the TCSI scores. Three analytical sections then interpret the results: the first reconstructs the acquisition logic of the Chávez period, the second analyzes the post-2013 rupture in financing and sustainment, and the third examines the functional transformation of the transfer relationship under Maduro. The conclusion returns to the hypotheses, states the limitations of the study, and draws implications for scholarship and policy.

LITERATURE REVIEW AND METHODOLOGY

Literature Review

The scholarship relevant to this article falls into four bodies of work that have developed largely in isolation from one another: the quantitative literature on arms-transfer determinants, the literature on defense-industrial absorption and sustainment, the area-studies literature on Russian and Chinese engagement with Venezuela, and the literature on Venezuelan civil–military relations and authoritarian survival.

The quantitative arms-transfer literature establishes that transfers of major conventional weapons are structured by political alignment rather than market logic. Network analysis of the international transfer system between 1950 and 2013 demonstrates that arms flows exhibit strong endogenous dependencies — reciprocity, preferential attachment, and bloc formation — and that the

post-Cold War network reorganized around a small number of supplier hubs (Thurner et al., 2019). Studies of military aircraft sales specifically show that supplier choice functions as a signal of security alignment, so that a fighter purchase is simultaneously a capability decision and a foreign-policy declaration (Willardson & Johnson, 2022). Research on embargoed states demonstrates that arms embargoes durably reshape import portfolios: recipients pivot to alternative suppliers, and the altered pattern persists even after restrictions end (Bove & Böhmelt, 2021). The behavior of suppliers toward authoritarian recipients follows the same political logic — comparative evidence on arms sales to South American dictatorships shows that alignment and threat perception, not human-rights performance, drive supply decisions (Fracalossi de Moraes, 2022). At the level of consequences, imports of major weapons raise the lethality of intrastate conflict conditionally on how force is employed (Mehrl & Thurner, 2020), and small-arms imports measurably increase the risk of internal conflict under specific regime configurations (Mehlretter, 2022) — findings directly relevant to a case in which 100,000 assault rifles were delivered to a polarizing state.

The second body of work concerns what happens after delivery. The literature on defense industrialization documents that most arms importers attempt to convert purchases into domestic capacity through licensed production and offsets, and that most such attempts fail because recipients lack the absorptive capacity — engineering depth, quality infrastructure, stable financing — that conversion requires (DeVore, 2021). Analysis of offset arrangements in combat-system procurement shows that the fiscal efficiency of direct offsets such as licensed production depends on institutional conditions that developing recipients rarely satisfy, and proposes structured instruments for evaluating them (Popov, 2024). The maintenance dimension has received renewed attention in the context of contested logistics: military

maintenance organizations hold some of the largest and least liquid spare-parts inventories in existence, and their performance collapses when supply lines are severed (Angelov, 2026). Additive manufacturing has been proposed as a partial remedy for exactly the spare-parts isolation that sanctioned or expeditionary operators face, with techno-economic validation showing that selective laser melting can substitute for a vulnerable conventional supply chain only where certification and machine-fleet investments have been made in advance (Tonkonogyi, 2024; Angelov, 2026). The economic literature adds that a domestic defense industry generates measurable multiplier effects on small economies, which is precisely the benefit an absorption failure forfeits (Risojević, 2024), and that military-to-civilian technology transfer constitutes a significant channel of technological progress that import-only recipients never access (Benali, 2025). The supplier side of the equation has also been quantified: the first systematic financial assessment of the Chinese defense industry shows that conglomerates such as NORINCO and CETC would rank among the largest arms producers in the world if included in standard rankings, underpinning an export offer that packages platforms with training, financing, and technology transfer (Béraud-Sudreau & Nouwens, 2021; Ali, 2020).

The third body of work is the area-studies literature on extra-regional powers in Venezuela. On the Russian side, the relationship has been characterized as the most controversial between a Latin American state and an external power precisely because of its military-technical origins, with corruption functioning as a “versatile amalgam” that binds the two elites (Cardozo Uzcátegui & Mijares, 2020). Systematic treatments identify political leadership, regime type, the military sector, the economy, and the triangular presence of China and the United States as the determinants of the partnership (Boersner Herrera & Haluani, 2023), and explain Russian support for a collapsing client through the trade-off

between changing and maintaining the status quo in a region of low intrinsic value to Moscow (Thoene et al., 2023). Russian lending to Venezuela has been analyzed as high-risk geoeconomic statecraft that produced concrete losses (Svoboda, 2024), and the durability of the partnership after 2022 has been questioned in light of Russia's war in Ukraine, which simultaneously reinforced Maduro's anti-Western discourse and constrained Russia's material capacity to deliver (Solar, 2023; Kosevich, 2023). The broader reorientation of Russian foreign policy toward the Global South as a demonstration of non-isolation frames the Venezuelan relationship as symbolically indispensable even when commercially exhausted (Vuksanović, 2025; Locoman & Papa, 2022). On the Chinese side, the literature documents an engagement that grew from energy cooperation into the largest bilateral credit relationship in Latin America, characterized either as South–South cooperation or as rearticulated dependency (To & Acuña, 2019; Vadell, 2019; Malacalza, 2019). Recent work traces three phases — active investment funds (2006–2016), retrenchment under sanctions and collapse (2016–2023), and cautious re-engagement through special economic zones (post-2023) — and concludes that Chinese engagement deepened oil dependency and produced structural stagnation (Bull & Rosales, 2026). Chinese strategic lending is shown to favor states distant from the United States in foreign-policy terms (Moura, 2025; Yueh, 2024), while the Belt and Road framework added little substantive change to an engagement already structured by loans-for-oil (Jenkins, 2022). The export of Chinese surveillance technology to authoritarian recipients — the category into which Venezuela's ZTE-supported “carnet de la patria” identity system falls — has been analyzed as a component of a global diffusion of digital repression (Feldstein, 2019; Seelke et al., 2022).

The fourth body of work concerns the recipient regime itself. The politicization of the Fuerza Armada Nacional Bolivariana

(FANB) proceeded in two stages: Chávez converted the armed forces into a political actor, and Maduro purchased their loyalty with autonomy in politics and the economy (Duarte Villa, 2022). Survey evidence shows that this politicization bifurcated public confidence in the military along partisan lines, destroying its bureaucratic neutrality (Polga-Hecimovich, 2019). The regime's survival under catastrophic economic conditions has been explained through “function fusion” — institutions performing each other's roles, with the military running businesses and civilian colectivos performing quasi-military repression (Corrales, 2020), through the deepening of rentier practices into gold, cryptocurrency, and commodity collateralization after the 2014 oil-price collapse (Rosales, 2019), and through the subnational machinery of autocratization (Polga-Hecimovich, 2022). The collapse of the oil industry that financed the rearmament has been attributed primarily to above-ground institutional risks — expropriation, fiscal instability, non-credible property rights — that predate sanctions (Monaldi et al., 2021), while econometric work attributes roughly half of the post-2017 production decline of internationally financed operators to financial and oil sanctions, equivalent to approximately 6.2 billion US dollars in annual losses (Rodríguez, 2022). Cross-national evidence adds that sanctions systematically strengthen the military's position within targeted regimes, as leaders redirect scarce resources toward the armed forces to secure loyalty (Kiyani et al., 2025) — a mechanism visible in Venezuela, where the regional pattern of assigning domestic missions to militaries further entrenches their political role (Jenne & Martínez, 2022; Saar, 2025). The comparative literature on post-communist civil–military transformation demonstrates that even two decades of NATO socialization leave residual deficits in civilian control (Angelov, 2025), underscoring how remote the Venezuelan case is from any institutionalized oversight of the arsenal it acquired.

What none of these literatures provides is a metric. The transfers are documented, the absorption failures are documented, and the regime dynamics are documented, but no instrument exists that integrates them into a single measure of whether a transferred arsenal is sustainable. Precedents for such structured instruments exist in adjacent domains — composite indices for offset fiscal efficiency (Popov, 2024) and for spare-parts autonomy under logistical isolation (Tonkonogyi, 2024) — but no equivalent exists for the sustainability of transferred capability as such. This is the gap the TCSI fills.

Research Methodology

The research applies a mixed methodological approach organized in three components. The first component is a longitudinal quantitative analysis of arms transfers to Venezuela in the 2001–2025 period, using the SIPRI Arms Transfers Database as the primary source for delivery volumes and timing (SIPRI, 2025c), the SIPRI fact sheets on international transfers and military expenditure for the global context (SIPRI, 2025a; SIPRI, 2025b), and the IISS Military Balance for order-of-battle and serviceability estimates (IISS, 2025). The analysis divides the observation window at 2013, the year of Maduro's assumption of power, producing two sub-periods of comparable length: 2005–2013 and 2014–2025.

The second component is a structured comparative case study of the two transfer channels, Russian and Chinese, across four categories of transfer: complete platforms, licensed production and industrial offsets, sustainment services (maintenance, training, spare parts), and dual-use technology. Sources for this component are official documents and institutional reports of the United States Congressional Research Service (Seelke et al., 2022; Congressional Research Service, 2025), RAND Corporation (Chindea et al., 2023), the Atlantic Council (Herbst & Marczak, 2019; Berg, 2024), CSIS

(Rendon & Fernandez, 2020), and the Wilson Center (Rouvinski, 2019), triangulated against the peer-reviewed area-studies literature cited above. Triangulation follows the rule that every quantitative claim must be supported by at least one institutional source and cross-checked against the academic literature where coverage overlaps.

The third component is the construction of the Transferred-Capability Sustainability Index. The TCSI is a composite of five dimensions, each scored on a 0–2 scale in half-point increments, yielding a total between 0 and 10. The first dimension, financing continuity (D1), measures whether the recipient can pay for acquisition and sustainment from stable resources. The second dimension, maintenance autonomy (D2), measures the share of the maintenance, repair, and overhaul cycle the recipient can perform without supplier personnel. The third dimension, technology absorption (D3), measures whether licensed production and offset commitments materialize into functioning industrial capacity. The fourth dimension, human capital retention (D4), measures whether the recipient trains and retains the operators and technicians the inventory requires. The fifth dimension, supplier commitment (D5), measures the reliability of the supplier's willingness to deliver, finance, and support under changed conditions. Each score is anchored to documented indicators specified in the results section; scoring is the author's structured coding of the documentary record, and the anchoring evidence for every score is cited so that the coding is replicable and contestable. The index is deliberately simple — five dimensions, equal weights, a transparent scale — following the design logic of comparable instruments in the defense-economics literature (Popov, 2024; Tonkonogiy, 2024), because the purpose of a first application is diagnostic decomposition rather than econometric estimation.

The scoring anchors of the TCSI are defined *ex ante* to discipline the coding. On financing continuity, a score of 2 requires that

acquisition and sustainment be financed from stable own resources or serviced credit; 1 requires that financing be available but volatile or collateralized; 0 denotes default, barter, or the absence of new financing. On maintenance autonomy, 2 requires that the recipient perform depot-level maintenance domestically; 1 denotes organizational-level maintenance with supplier-dependent depot cycles; 0 denotes dependence on supplier personnel for routine serviceability. On technology absorption, 2 requires functioning licensed production or localized MRO; 1 denotes contracted but incomplete absorption projects; 0 denotes abandoned or failed projects. On human capital retention, 2 requires functioning training pipelines and retention of technical cadres; 1 denotes functioning pipelines with degraded selection or early attrition; 0 denotes mass exit of technical personnel or supplier-operated training. On supplier commitment, 2 requires demonstrated willingness to contract, deliver, and finance new capability; 1 denotes sustainment-only commitment; 0 denotes disengagement. Half-point scores are permitted where the record sits between anchors, and every assigned score in the results section is accompanied by its documentary basis, so that a reader who disputes a score can locate exactly which evidence would have to be reinterpreted (Popov, 2024; Tonkonogiy, 2024).

Three methodological choices require justification. The periodization at 2013 is substantive, not arbitrary: it corresponds simultaneously to the change of head of state, to the peak of the delivery cycle, and to the last year before the oil-price collapse of 2014 that removed the program's fiscal basis (Monaldi et al., 2021; Rosales, 2019). The restriction of the analysis to Russian and Chinese channels reflects their overwhelming dominance of Venezuelan imports after the United States embargoed arms sales in 2006 (Bove & Böhmelt, 2021; Seelke et al., 2022). Finally, the reliance on open sources is unavoidable in a case where the recipient publishes no defense budget breakdowns and the suppliers publish

no contract details; the limitation is stated explicitly in the conclusion.

RESEARCH RESULTS

The empirical analysis generated findings that can be organized in three blocks, corresponding to the three research hypotheses. The first block of findings concerns the structure of the transfer time series. Venezuelan imports of major conventional weapons in the observation window are massively concentrated in the 2006–2015 decade, with deliveries falling to negligible levels after 2016 (SIPRI, 2025c). Within the concentration, the value structure is dominated by Russia: approximately 11 billion US dollars of Russian defense sales were agreed in the 2001–2013 period (Seelke et al., 2022), of which roughly 4 billion US dollars were contracted on Russian state credit between 2005 and 2008 (Herbst & Marczak, 2019). The principal delivered systems are summarized in Table 1. Venezuela's debt to Russia for combat aircraft alone was estimated at approximately 10

billion US dollars, still outstanding as of 2019 (Herbst & Marczak, 2019; Rendon & Fernandez, 2020). After 2013, no new major platform contract with Russia was concluded and executed on a comparable scale; the documented Russian activities in the 2014–2025 period consist of sustainment interventions — the March 2019 deployment of approximately one hundred specialist personnel to service previously delivered equipment, the April 2019 opening of a helicopter training center, and episodic strategic-bomber visits in 2008, 2013, and 2018 (Seelke et al., 2022). The Chinese channel shows the same temporal signature at lower volume: platform deliveries (K-8W trainers, VN-4 armored vehicles, transport and utility equipment) cluster before 2016, and by October 2020 China had made no new military equipment sale to Venezuela for two years (Rendon & Fernandez, 2020; IISS, 2025). By the 2020–2024 window, Russia's global arms exports had themselves fallen 64% relative to 2015–2019 (SIPRI, 2025a), removing supplier-side slack that might otherwise have revived the pipeline.

<i>System</i>	<i>Origin</i>	<i>Category</i>	<i>Documented scale</i>	<i>Source</i>
<i>Su-30MK2</i>	Russia	Multirole fighter	24 aircraft	(Rouvinski, 2019; IISS, 2025)
<i>AK-103</i>	Russia	Assault rifle	100,000 units	(Rouvinski, 2019)
<i>Mi-17V-5 / Mi-35M2 / Mi-26T</i>	Russia	Transport / attack helicopters	approx. 50 airframes	(Rouvinski, 2019; Seelke et al., 2022)
<i>S-300VM (Antey-2500)</i>	Russia	Long-range air defense	battery-level deployment	(Herbst & Marczak, 2019; IISS, 2025)
<i>T-72B1</i>	Russia	Main battle tank	battalion-scale deliveries	(IISS, 2025)
<i>BMP-3 / BTR-80A</i>	Russia	Armored fighting vehicles	battalion-scale deliveries	(IISS, 2025)
<i>K-8W Karakorum</i>	China	Trainer / light attack	squadron-scale deliveries	(IISS, 2025)
<i>VN-4</i>	China	Armored personnel carrier	internal-security fleets	(Rendon & Fernandez, 2020)

Table 1. Principal documented Russian and Chinese military systems delivered to Venezuela, 2005–2016. Source: author's compilation from the cited references.

The concentration of the delivery schedule visible in Table 1 has a fiscal signature: the acquisition contracts cluster in the 2005–2010 window, deliveries extend through the mid-2010s, and the S-300VM — the last major system to arrive — reaches Venezuela at approximately the moment of the political transition itself (Herbst & Marczak, 2019; IISS, 2025). The global context sharpens the finding: in the 2020–2024 window the United States accounted for 43% of world exports of major arms while Russia's share collapsed, and world military expenditure reached 2,718 billion US dollars in 2024 — the steepest annual rise since at least 1988 (SIPRI, 2025a; SIPRI, 2025b). Venezuela is thus a state whose import profile went to zero during the largest global rearmament in a generation, an inversion that no purely external variable can explain (SIPRI, 2025c; Congressional Research Service, 2025).

The second block of findings concerns the enabling conditions of the two periods. In the acquisition period, Venezuela's fiscal capacity rested on an oil sector that generated the resources for both cash purchases and credit service; in the sustainment period this basis disappeared: GDP contracted by more than 80% between 2013 and 2020, and the 2024 economy remained less than half its 2013 size (Congressional Research Service, 2025). Oil production collapsed under the combined weight of expropriation-driven institutional decay documented before sanctions (Monaldi et al., 2021) and of financial and oil sanctions after 2017, which alone account for approximately half of the production decline among internationally financed operators — approximately 6.2 billion US dollars in annual losses (Rodríguez, 2022). The human capital base contracted in parallel: 7.9 million Venezuelans had left the country by 2025, with survey-based research documenting the departure of the young and educated cohorts from which military technicians are drawn (Congressional Research Service, 2025; Weitzman & Huss, 2024).

Approximately 73% of the remaining population was in poverty in 2024 (Congressional Research Service, 2025). On the financing side, the Chinese credit relationship — the largest Chinese bilateral lending relationship in Latin America — stopped generating new development lending after 2016, entering a phase of retrenchment and repayment management (Bull & Rosales, 2026; Yuch, 2024), while Russian lending to Venezuela is classified in the geoeconomic literature as a loss-producing exposure (Svoboda, 2024). Rosneft's investment of approximately 9 billion US dollars in the Venezuelan oil sector, and its lending of 6.5 billion US dollars to PDVSA between 2014 and 2016 against future deliveries, converted the residual relationship into collateralized commodity extraction rather than defense-industrial cooperation (Seelke et al., 2022; Herbst & Marczak, 2019; Rosales, 2019).

The third block of findings is the TCSI scoring, which integrates the documentary record into the index defined in the methodology. For the 2005–2013 period the coding yields the following values. Financing continuity scores 2.0: acquisitions were financed from boom-period oil revenue and serviced Russian credit lines (Herbst & Marczak, 2019; Monaldi et al., 2021). Maintenance autonomy scores 1.0: the FANB operated the new inventory but the maintenance cycle for high-end systems remained supplier-dependent from the outset, a standard condition of Russian export packages (Rouvinski, 2019; IISS, 2025). Technology absorption scores 1.0: the Kalashnikov plant and associated offsets were contracted and under construction but not completed within the period (Rouvinski, 2019). Human capital retention scores 1.5: training pipelines functioned and emigration had not yet begun, but politicized promotion criteria were already degrading professional selection (Polga-Hecimovich, 2019; Duarte Villa, 2022). Supplier commitment scores 1.5: both suppliers delivered on schedule, with Russia's commitment demonstrably

robust and China's more conservative (Cardozo Uzcátegui & Mijares, 2020; Rendon & Fernandez, 2020). The 2005–2013 TCSI is therefore 7.0 out of 10. For the 2014–2025 period the coding yields: financing continuity 0.5 (default-range debt, collateralized oil, no new credit) (Svoboda, 2024; Bull & Rosales, 2026); maintenance autonomy 0.5 (supplier personnel required in-country to sustain the inventory) (Seelke et al., 2022); technology absorption 0.5 (flagship plant unfinished amid corruption findings) (Rouvinski, 2019; Rendon & Fernandez, 2020); human capital retention 0.5 (mass emigration including technical cadres; training centers operated by the supplier) (Weitzman & Huss, 2024; Seelke et al., 2022); supplier commitment 1.0 (symbolic and sustainment support

continued, but Russian export capacity contracted 64% globally and Chinese sales paused entirely) (SIPRI, 2025a; Solar, 2023; Rendon & Fernandez, 2020). The 2014–2025 TCSI is therefore 3.0 out of 10. The index declines by 4.0 points, or 57%, across the 2013 threshold. The dimensional decomposition is presented in Table 2. Two features of the decomposition deserve emphasis at the descriptive level: no dimension improves across the threshold, and the steepest single-dimension falls are in financing continuity (–1.5) and human capital retention (–1.0), the two dimensions least connected to the arms-transfer relationship itself and most connected to the general collapse of the Venezuelan state (Congressional Research Service, 2025; Corrales, 2020).

<i>TCSI dimension</i>	<i>2005– 2013</i>	<i>2014– 2025</i>	<i>Change</i>	<i>Principal anchoring evidence</i>
<i>D1 Financing continuity</i>	2.0	0.5	–1.5	(Herbst & Marczak, 2019; Svoboda, 2024; Bull & Rosales, 2026)
<i>D2 Maintenance autonomy</i>	1.0	0.5	–0.5	(Seelke et al., 2022; IISS, 2025)
<i>D3 Technology absorption</i>	1.0	0.5	–0.5	(Rouvinski, 2019; Rendon & Fernandez, 2020)
<i>D4 Human capital retention</i>	1.5	0.5	–1.0	(Weitzman & Huss, 2024; Polga-Hecimovich, 2019)
<i>D5 Supplier commitment</i>	1.5	1.0	–0.5	(SIPRI, 2025a; Solar, 2023; Rendon & Fernandez, 2020)
<i>TCSI total</i>	7.0	3.0	–4.0 (–57%)	—

Table 2. Transferred-Capability Sustainability Index (TCSI) for Venezuela: dimensional decomposition by period
Source: author's coding of the documentary record; scale 0–2 per dimension, 0–10 total.

Three subsidiary findings complete the results. First, the composition of transfers shifts across the threshold from platforms toward services and dual-use technology: the documented post-2013 items are maintenance deployments, training infrastructure, financing rollovers, and surveillance technology — notably the ZTE-supported “carnet de la patria” identity-and-benefits database reported from 2018 (Seelke et al., 2022; Feldstein, 2019) — rather than weapons systems. Second, the military's institutional position

inside the regime strengthened while its inventory decayed, consistent with the cross-national finding that sanctions shift the civil–military balance toward the armed forces (Kiyani et al., 2025; Duarte Villa, 2022; Corrales, 2020). Third, the 2018 attempted drone attack on Maduro and the subsequent Venezuelan interest in unmanned systems illustrate the substitution channel predicted by the drone-proliferation literature: when high-end sustainment fails, cheap unmanned capability becomes the marginal military

investment of both regimes and their opponents (Chávez & Swed, 2021).

THE ACQUISITION DECADE: OIL RENT, EMBARGO, AND THE POLITICS OF SUPPLIER SUBSTITUTION

The Chávez-era rearmament is best understood as the intersection of three causal streams: a fiscal windfall, a supply shock, and a political project. Each stream is necessary to the outcome; none is sufficient alone.

The fiscal stream is the most straightforward. The Venezuelan state entered the mid-2000s with rapidly expanding oil rent, and the petro-state literature documents how that rent was channeled through discretionary presidential funds with minimal legislative oversight — an institutional configuration that made large, fast, politically symbolic procurement possible (Monaldi et al., 2021; Buxton, 2020). The rearmament was, in fiscal terms, one program among several through which windfall rent was converted into political capability; what distinguished it was that its recurrent costs — maintenance, training, spares — were systematically underweighted at the moment of contract, a pattern the defense-economics literature identifies as typical of importers without institutionalized life-cycle costing (DeVore, 2021; Popov, 2024). The contrast with the European rearmament wave after 2022, in which sustainment and industrial capacity were treated as the core of the effort rather than an afterthought, is instructive: where reindustrialization programs build factories and jobs first — more than 70 new facilities and approximately 210,000 jobs in the NATO case (Knežević, 2025) — the Venezuelan program bought finished platforms and deferred industry to a plant that was never completed (Rouvinski, 2019).

The supply shock was the United States arms embargo of 2006, which cut Venezuela off from US-origin equipment and spare parts, including support for its existing F-16 fleet (Seelke et al., 2022). The embargo literature predicts precisely what followed:

embargoed states do not disarm, they re-source, and the re-sourced portfolio persists beyond the embargo itself (Bove & Böhmelt, 2021). Venezuela's pivot to Russia was thus overdetermined — ideologically congenial, commercially available, and technically forced. The choice of supplier carried the alignment signal that the arms-transfer literature identifies in fighter procurement (Willardson & Johnson, 2022; Thurner et al., 2019): the Su-30MK2 contract announced not only an air-defense capability but a geopolitical reorientation, which Moscow reciprocated with strategic-bomber visits in 2008 and after (Seelke et al., 2022; Kosevich, 2023). For Russia, Venezuela offered what the literature on supplier motives describes as the standard package of a latecomer competing for unoccupied markets: revenue, market entry, and a demonstration platform in the adversary's hemisphere (Svoboda, 2024; Ali, 2020; Vuksanović, 2025). Corruption lubricated the channel on both sides, functioning — in the most precise formulation in the literature — as a versatile amalgam that improved political cohesion between the two elites while undermining the rule of law in the recipient (Cardozo Uzcátegui & Mijares, 2020).

The political project completes the triad. The rearmament was inseparable from the transformation of the FANB into a regime institution: Chávez moved the armed forces into politics, expanded their missions, and used procurement as a loyalty instrument (Duarte Villa, 2022; Polga-Hecimovich, 2019). The 100,000 AK-103 rifles and the licensed plant to produce more were sized not for the regular army alone but for a mass militia concept, an intent whose internal-security implications the small-arms literature makes legible: large small-arms inflows into polarized polities measurably raise internal conflict risk (Mehltretter, 2022; García-Guadilla & Mallen, 2019). The regional pattern reinforced the domestic one: Latin American governments routinely assign militaries domestic missions that erode democratic

control (Jenne & Martínez, 2022), and Venezuela pushed this pattern to its limit, with the military accumulating economic functions that the literature on authoritarian survival describes as function fusion (Corrales, 2020). Procurement, in this configuration, was never a purely military act; it was the material dimension of a civil–military bargain.

The Chinese channel of the acquisition decade obeyed a different logic. China's engagement was credit-led rather than platform-led: the loans-for-oil architecture built from 2007 onward made Venezuela the largest recipient of Chinese policy-bank lending in Latin America, while arms deliveries — K-8W trainers, transport equipment, later VN-4 armored vehicles — remained a subordinate line of business (Bull & Rosales, 2026; To & Acuña, 2019; IISS, 2025). The lending pattern matches the econometric finding that Chinese official finance flows disproportionately to states distant from the United States in foreign-policy terms (Moura, 2025), and the relationship's formal escalation through successive partnership designations tracked the political rather than the military relationship (Dominguez, 2024). Chinese supplier behavior toward Venezuela was conservative in exactly the way the comparative literature on Chinese arms clients predicts for low-absorption recipients: platforms suitable for training and internal security, packaged financing, and no transfer of high-end systems (Ali, 2020; Béraud-Sudreau & Nouwens, 2021). The result was that by 2013 Venezuela had two asymmetric dependencies — a Russian dependency concentrated in combat capability and a Chinese dependency concentrated in credit — with no domestic industrial layer beneath either (Vadell, 2019; Malacalza, 2019; Risojević, 2024).

The prestige economy of the acquisition decade also requires acknowledgment, because part of what Venezuela bought was never intended to be sustained. Strategic-bomber visits in 2008 and 2013, combined naval exercises, and the theatrical unveiling of each new system served a signaling function

directed simultaneously at Washington, at the region, and at the domestic audience (Seelke et al., 2022; Kosevich, 2023). The arms-transfer literature recognizes this register explicitly: major-platform acquisitions communicate alignment and status independently of their operational employment, and for some recipients the communicative value dominates the military value at the moment of purchase (Willardson & Johnson, 2022; Thurner et al., 2019). The Venezuelan case pushed the ratio to an extreme — a fighter fleet and a strategic air-defense complex procured by a state facing no plausible conventional attacker functioned primarily as the material vocabulary of the Bolivarian claim to sovereignty against the United States (Boersner Herrera & Haluani, 2023; Buxton, 2020). The TCSI has no dimension for prestige, deliberately: prestige is realized in full at delivery and depreciates with the platforms that embody it, which is precisely why a modernization purchased for signaling value systematically underinvests in the sustainment dimensions the index measures (DeVore, 2021; Willardson & Johnson, 2022).

What the acquisition decade did not build is as important as what it bought. The offset and licensed-production components that constitute the absorption channel in successful importers (Popov, 2024; DeVore, 2021) remained paper commitments: the Kalashnikov plant, contracted in 2006, was still incomplete in 2019 amid corruption investigations in its construction (Rouvinski, 2019; Rendon & Fernandez, 2020). No maintenance, repair, and overhaul capacity for the Su-30 fleet or the air-defense complex was localized (IISS, 2025; Seelke et al., 2022). The multiplier effects that defense-industrial localization generates for small economies (Risojević, 2024), and the civilian spillovers that military production feeds in functioning innovation systems (Benali, 2025), were therefore never available to Venezuela. In TCSI terms, the acquisition decade produced a high score on financing and supplier commitment built atop low scores on maintenance

and absorption — a 7.0 that was structurally front-loaded, sustainable only while oil rent and supplier goodwill both persisted.

THE SUSTAINMENT COLLAPSE: FISCAL RUPTURE, SANCTIONS, AND THE ARITHMETIC OF DECAY

The 2013 transition is conventionally narrated politically; its military-industrial meaning is better captured fiscally. Maduro inherited the arsenal at the exact moment its enabling conditions expired. The 2014 oil-price collapse halved the state's export revenue base; the institutional decay of PDVSA — expropriations, politicized management, diverted investment — had already set production on a declining path before any external pressure (Monaldi et al., 2021; Rosales, 2019). The macroeconomic consequence was the deepest peacetime contraction recorded in the hemisphere: more than 80% of GDP between 2013 and 2020 (Congressional Research Service, 2025). A rearmament program whose recurrent costs had been deferred into exactly this window met the arithmetic of decay: fighter fleets require continuous OEM support, air-defense systems require component rotation, armored vehicles require climate-appropriate storage and parts — and each of these lines competed with food imports in a collapsing budget (IISS, 2025; Bull & Rosales, 2020).

Sanctions accelerated what institutional decay had begun. The econometric evidence is precise on this point and warns against monocausal readings in either direction: approximately half of the post-2017 production decline among internationally financed oil operators is attributable to financial and oil sanctions — roughly 6.2 billion US dollars in foregone annual revenue — while the other half reflects the pre-existing collapse of state capacity (Rodríguez, 2022; Monaldi et al., 2021). For the sustainment question, sanctions had a second-order effect the civil-military literature identifies cross-nationally: they strengthened the military's bargaining

position inside the regime, as the leadership redirected shrinking resources toward the institution whose loyalty guarantees survival (Kiyani et al., 2025). Venezuela thus exhibits the paradox the TCSI decomposition makes visible: the political weight of the FANB rose while the material readiness of its inventory fell — autonomy in politics and the economy substituting for serviceable equipment as the currency of the civil-military bargain (Duarte Villa, 2022; Corrales, 2020; Bull & Rosales, 2020).

The budgetary mechanics of the collapse deserve separate statement, because they operated even where headline allocations appeared protected. Venezuelan defense spending in the Maduro period was consumed by hyperinflation faster than it could be appropriated, and the IISS assessment is that the defense budget's purchasing power persistently failed to keep pace with the cost of sustaining the inventory (IISS, 2025). The regime's compensation to the armed forces therefore took non-budgetary forms: command of food import and distribution networks, control of the state oil company's management tiers, and stakes in the informalized gold economy of the Orinoco Mining Arc (Corrales, 2020; Rosales, 2019; Bull & Rosales, 2020). This substitution — economic rent in place of operational funding — rationally reallocated the officer corps' attention away from readiness and toward extraction, with the predictable consequence that the institution's political reliability and its military serviceability moved in opposite directions (Duarte Villa, 2022; Kiyani et al., 2025). The pattern is an extreme case of the regional syndrome in which domestic missions and economic roles substitute for defense functions (Jenne & Martínez, 2022; Saar, 2025), and it completes the causal chain of the sustainment collapse: the same bargain that kept the FANB loyal to Maduro guaranteed that no institutional constituency existed for prioritizing the maintenance of the Chávez-era arsenal (Corrales, 2020; Polga-Hecimovich, 2019).

The documented Russian behavior in this period constitutes the clearest single body of evidence for the sustainment collapse. In March 2019 approximately one hundred Russian specialist personnel deployed to Venezuela explicitly to service previously delivered equipment; in April 2019 a Russian-operated helicopter training center opened near Caracas (Seelke et al., 2022). In the framework of this article these are not gestures of strength but diagnostics of failure: a recipient that requires supplier personnel in-country to keep its inventory operational has, by definition, a maintenance-autonomy score approaching zero. The maintenance literature explains the mechanism without residue: sustainment systems fail at their least liquid point — spare parts — and a recipient without domestic MRO capacity, without certified additive-manufacturing substitutes, and without hard currency for expedited orders has no path around a severed supply chain (Angelov, 2026; Tonkonogyi, 2024). Cannibalization — the consumption of part of the fleet to keep a fraction flying — is the standard terminal stage of such systems (IISS, 2025). The human capital dimension compounded the material one: the emigration of 7.9 million Venezuelans included the technical cohorts from which maintainers are recruited, and survey-based demographic research documents precisely the household-level survival logic that drove the educated young abroad (Weitzman & Huss, 2024; Congressional Research Service, 2025). Politicized promotion had meanwhile degraded the officer corps' professional incentives for a generation (Polga-Hecimovich, 2019; Saar, 2025).

Supplier commitment, the fifth TCSI dimension, eroded from both directions. Russian capacity contracted: global Russian arms exports fell 64% between 2015–2019 and 2020–2024 as the war in Ukraine absorbed production and sanctions constrained finance (SIPRI, 2025a), and the scholarship on the post-2022 relationship converges on the judgment that Moscow's support for Caracas became more symbolic and less material —

solidarity, disinformation alignment, and diplomatic cover rather than new capability (Solar, 2023; Kosevich, 2023). Russian lending, already classified as a loss-producing geoeconomic gamble (Svoboda, 2024), gave way to collateralized extraction through Rosneft — 6.5 billion US dollars lent against future oil between 2014 and 2016, approximately 9 billion invested in upstream positions, and two-thirds of PDVSA's exports handled by August 2019 (Herbst & Marczak, 2019; Seelke et al., 2022). Chinese behavior was still more conservative: no new military equipment sales for two years by October 2020, no new development lending after 2016, and a re-engagement after 2023 channeled through special economic zones rather than defense cooperation (Rendon & Fernandez, 2020; Bull & Rosales, 2026; Jenkins, 2022). Both suppliers, in short, applied the recipient-risk discipline that their own literatures predict (Moura, 2025; Ali, 2020) — and Venezuela, as a client, had no alternative supplier to defect to, the mirror image of the embargo-pivot flexibility it had exercised in 2006 (Bove & Böhmelt, 2021).

The arithmetic of the TCSI captures the net effect. Every dimension declined; the index halved and more. But the decomposition also discriminates between causes. The two steepest falls — financing continuity and human capital retention — are properties of the Venezuelan state, not of the transfer relationship; the two dimensions where the relationship itself failed — technology absorption and maintenance autonomy — were already weak at the peak of the partnership. This is the empirical basis for the article's central analytical claim: sanctions and supplier fatigue accelerated the collapse, but the unsustainability was designed into the program by the absorption failure of the acquisition decade. A modernization that builds no industrial and human layer beneath its imports has no mechanism for surviving the interruption of those imports (DeVore, 2021; Angelov, 2026; Risojević, 2024).

FROM PLATFORMS TO SURVIVAL SERVICES: THE FUNCTIONAL TRANSFORMATION OF THE TRANSFER RELATIONSHIP UNDER MADURO

If the transfer relationship had merely shrunk after 2013, the case would be analytically banal. What makes it theoretically productive is that the relationship transformed: the composition of what Russia and China transferred to Venezuela shifted from weapons platforms toward a portfolio of regime-survival services, and this shift tracks the recipient's transformation from a state buying capability into a regime buying time.

The post-2013 Russian portfolio is legible as a survival package. Its components — debt rollovers and restructuring, sustainment deployments, training infrastructure, episodic strategic signaling such as the December 2018 bomber visit, and intensive diplomatic and informational alignment (Seelke et al., 2022; Solar, 2023) — share the property that they stabilize the incumbent rather than augment the state. The area-studies literature converges on this reading: Russian support is explained by the value of demonstrating great-power reach and non-isolation at low cost (Vuksanović, 2025; Thoene et al., 2023), by the two-good logic of maintaining a status-quo client against US-backed change (Thoene et al., 2023), and by the accumulated corruption equities that bind elite networks on both sides (Cardozo Uzcátegui & Mijares, 2020). The relationship's classification matters for theory: it is not an alliance in any formal sense — the Russian literature itself treats formal defense commitments as declining instruments (Locoman & Papa, 2022) — but an alignment sustained by asymmetric usefulness, in which Venezuela supplies symbolic geography and Russia supplies survival services (Kosevich, 2023; Boersner Herrera & Haluani, 2023). The war in Ukraine stress-tested the alignment and revealed its ceiling: Caracas delivered rhetorical solidarity and sanctions-evasion cooperation, Moscow

delivered less than before, and both sides discovered that the material relationship had become residual (Solar, 2023; SIPRI, 2025a).

The Chinese portfolio transformed along a different axis: from credit to control technology. New lending stopped after 2016, but the dual-use channel persisted and deepened — most consequentially in the ZTE-supported carnet de la patria system, a national identity-and-benefits database that fuses welfare distribution with political monitoring, reported from 2018 (Seelke et al., 2022). The digital-repression literature provides the frame: China's export of AI-enabled surveillance to authoritarian and illiberal recipients lowers the cost of repression and substitutes monitoring for violence at the margin (Feldstein, 2019). In TCSI terms, surveillance technology is the perfect post-collapse transfer: it requires no maintenance ecosystem comparable to a fighter fleet, no hard-currency stream comparable to platform procurement, and no human capital the regime does not already command — while directly servicing the incumbent's core need. The VN-4 armored vehicles delivered under Chávez completed the same logic from the kinetic side when they were deployed against protesters in 2019 (Rendon & Fernandez, 2020): the surviving useful arsenal was the internal-security arsenal. Chinese soft-power instruments — pandemic diplomacy prominent among them — rounded out an engagement that remained politically warm while militarily dormant (Xing, Vadell & Rubiolo, 2023; Dominguez, 2024).

The informational dimension of the post-2013 relationship warrants its own register, because it is the component of the survival package with the lowest marginal cost to the supplier and the highest deniability. Years of state-aligned media construction allowed Caracas to run a sustained information campaign that never cast Moscow as an aggressor — neither over Crimea in 2014 nor over the full-scale invasion of 2022 — and that folded Venezuelan domestic narratives into Russian strategic messaging about a multipolar order

under construction (Solar, 2023; Ellner, 2023). The mechanics of such campaigns are now formally modeled: disinformation propagates through networked media ecosystems with measurable amplification dynamics, and hybrid-warfare scholarship treats the informational channel as a co-equal instrument alongside the military and economic ones (Pantić, 2025). In the Venezuelan configuration the informational alignment did double duty — externally it supplied Russia with a hemispheric echo at negligible cost, and internally it supported the regime's narrative management of scarcity, protest, and sanctions (Solar, 2023; Corrales, 2020). For the TCSI framework the significance is definitional: informational support is the limiting case of a survival service, a transfer that sustains the political relationship while requiring no hard currency, no logistics, and no absorptive capacity whatsoever from the recipient (Feldstein, 2019; Pantić, 2025).

The recipient's own adaptations complete the functional picture. Where the high-end inventory decayed, the regime's coercive capacity migrated downward and outward: to the militia and colectivos performing quasi-military functions in the function-fusion pattern (Corrales, 2020), to the military's occupation of economic sectors from food distribution to gold — the radical-rentier adaptation that converted the FANB into a stakeholder of informalized extraction (Rosales, 2019; Bull & Rosales, 2020) — and to cheap unmanned systems, whose double-edged salience the August 2018 drone attack on Maduro announced: the same proliferation dynamics that gave the regime an affordable substitute capability gave its opponents one too (Chávez & Swed, 2021). Subnational autocratization supplied the political counterpart, replacing competitive manipulation with overt fraud as the inventory of legitimacy decayed alongside the inventory of arms (Polga-Hecimovich, 2022; Ellner, 2023). The composite is a regime that no longer procures capability against external threats but assembles survival inputs —

Russian sustainment, Chinese monitoring, militia coercion, rent from informalized commodities — into what the arms-transfer network literature would describe as a node that has fallen out of the capability network while remaining embedded in the alignment network (Thurner et al., 2019; Willardson & Johnson, 2022).

The theoretical yield of the transformation is the second half of the article's contribution. The TCSI measures sustainability; the Venezuelan trajectory shows what unsustainability produces — not disarmament, but functional substitution. A recipient whose transferred capability collapses does not revert to the status quo ante; it re-purposes the surviving components (internal-security platforms, small arms, surveillance infrastructure) and re-prices the relationship (from procurement to survival services). This proposition is generalizable and testable: recipients with low and falling TCSI scores should exhibit portfolio shifts toward sustainment, dual-use, and internal-security transfers, while recipients with high scores should exhibit platform-dominated portfolios. The comparative agenda this opens — Myanmar after 2021, Iran under long embargo, Belarus after 2020 — is specified in the conclusion (Bove & Böhmelt, 2021; Fracalossi de Moraes, 2022).

VENEZUELA IN THE HEMI-SPHERIC AND SYSTEMIC ARMS-TRANSFER ORDER: COMPETITION, ASYMMETRY, AND THE LIMITS OF GREAT-POWER PATRONAGE

The Venezuelan trajectory acquires its full meaning only against the systemic background of great-power competition in the Western Hemisphere, because the transfer relationships analyzed above were embedded from the outset in a triangular structure — Russia, China, and the United States — whose dynamics constrained every actor's choices. Two decades of Russian and

Chinese penetration of Latin America have been systematically mapped: Chinese influence-seeking grew the most among US competitors in the region, while Russian engagement concentrated on a narrow set of partner regimes, with Venezuela, Cuba, and Nicaragua identified as the priority states for escalation monitoring (Chindea et al., 2023). The two external powers engage the region differently — China through trade, finance, and infrastructure at scale, Russia through arms, security assistance, and political warfare at low cost — but both derive strategic value from the same geographic fact of operating in the declared sphere of US primacy (Berg, 2024; Chindea et al., 2023). What is analytically remarkable is how long this penetration proceeded without a US response: for most of the first two decades of the century Washington did not contest the advance, and the counterbalancing turn came only with the change of national mood and personnel after 2017 (Leiva Van de Maele, 2026). Venezuela's rearmament window fell precisely inside this permissive interval — the program was contracted, financed, and largely delivered before the United States began treating extra-hemispheric military presence in the Americas as a strategic problem (Leiva Van de Maele, 2026; Seelke et al., 2022).

Within this triangle, Venezuela's position was structurally weaker than the rhetoric of multipolarity suggested. The multipolar framing was sincere on both sides — the Caracas–Beijing relationship was formally elevated to an “all-weather strategic partnership” and explicitly theorized as the construction of a multipolar order (Dominguez, 2024), while Moscow valued the relationship as proof of global reach after 2014 and again after 2022 (Vuksanović, 2025; Solar, 2023). But the material asymmetries ran entirely one way. For Russia, Venezuela was a demonstration platform whose total acquisition value — approximately 11 billion US dollars over twelve years (Seelke et al., 2022) — amounted to a fraction of a single year of Russian exports at their peak, and whose debt could be

carried as a geopolitical expense (Svoboda, 2024). For China, Venezuela was one node in a lending portfolio whose logic was hemispheric and commercial, and Chinese behavior — pausing sales, halting new credit, re-engaging cautiously through special economic zones — tracked portfolio discipline rather than alliance solidarity at every decision point (Bull & Rosales, 2026; Moura, 2025; Jenkins, 2022). For Venezuela, by contrast, the two relationships were existential: they supplied the entire high-end inventory, the majority of external credit, and, after 2017, the margin of regime survival (Corrales, 2020; Rendon & Fernandez, 2020). The literature on asymmetric alignment predicts the consequence: the weaker party absorbs the adjustment costs when the stronger parties' calculations change (Locoman & Papa, 2022; Kosevich, 2023) — and after 2014, and again after 2022, they changed.

The comparative dimension underscores how atypical the Venezuelan absorption failure was in degree, not in kind. The general finding that importers pursuing defense-industrial autonomy usually fail (DeVore, 2021) admits of gradations: states with functioning engineering bases and stable financing — the profile of the more successful post-embargo adapters — convert some fraction of offsets into real capacity, while states without them convert nearly none (Popov, 2024; Béraud-Sudreau & Nouwens, 2021). Venezuela occupied the extreme of the second category. Its single flagship absorption project, the Kalashnikov plant, was a technologically modest undertaking — licensed production of a mature small-arms design — and still failed on a timescale of two decades, undone not by technical difficulty but by the corruption documented in its construction and the collapse of the state around it (Rouvinski, 2019; Cardozo Uzcátegui & Mijares, 2020). The counterfactual benchmark is supplied by the contemporary European experience, where rearmament under threat proceeded in the opposite order: industrial capacity, employment, and sustainment infrastructure first —

over 70 new facilities and approximately 210,000 defense-sector jobs opened in the 2022–2025 wave — with platform acquisition layered on top of an absorptive base (Knežević, 2025). The comparison is unfor- giving: the same decade in which European states converted threat into industrial capac- ity, Venezuela converted the hemisphere's largest imported arsenal into a maintenance queue (IISS, 2025; Angelov, 2026).

The systemic reading also clarifies the one domain in which Venezuelan capability adapted rather than decayed: the low end. The global diffusion of cheap unmanned sys- tems has restructured the marginal cost of airpower for weak states and non-state actors alike (Chávez & Swed, 2021), and the battle- field evidence that sub-kilogram FPV plat- forms function as precision munitions at three orders of magnitude below the cost of conventional strike (Akulina, 2025) defines the substitution frontier available to a state that can no longer sustain a fourth-generation fighter fleet. Venezuela encountered this frontier from both sides — as a target, in the 2018 drone attempt against Maduro, and as an aspirant operator seeking unmanned capa- bility thereafter (Chávez & Swed, 2021; Seelke et al., 2022). The TCSI logic explains the attraction: unmanned systems are the one capability class whose sustainment require- ments — commercial components, software skills, no OEM dependency — match the re- sidual absorptive capacity of a collapsed state (Angelov, 2026; Akulina, 2025). The hemi- sphere's next arms-transfer problem, the Venezuelan case suggests, will not be another S-300 sale; it will be the diffusion of exactly this class of capability to states and armed ac- tors whose TCSI scores make everything else unsustainable (Chávez & Swed, 2021; Chin- dea et al., 2023).

CONCLUSION

The article set out to explain, and to measure, the unsustainability of the largest military modernization in modern Latin

American history. Its findings can be stated as answers to the three hypotheses.

The first hypothesis, that 2013 consti- tutes a structural rupture rather than a gradual inflection, is confirmed. The delivery time se- ries collapses to negligible levels after 2016 with no subsequent recovery (SIPRI, 2025c); no post-2013 Russian platform contract comparable to the 2005–2013 cycle was exe- cuted; Chinese military sales paused entirely for years at a time (Rendon & Fernandez, 2020). Every enabling condition of the acqui- sition decade — oil rent, credit access, sup- plier capacity, human capital — deteriorated discontinuously across the threshold (Con- gressional Research Service, 2025; Monaldi et al., 2021; SIPRI, 2025a). The TCSI decline from 7.0 to 3.0 aggregates this rupture into a single measured quantity.

The second hypothesis, that the function of the transfer relationship shifted from ca- pability acquisition to regime survival, is con- firmed with a specification. The post-2013 portfolio is demonstrably dominated by sus- tainment services, debt management, sym- bolic signaling, and dual-use surveillance technology (Seelke et al., 2022; Feldstein, 2019; Solar, 2023). The specification is that the shift was jointly produced: supplier re- straint (Russian capacity contraction, Chinese risk discipline) and recipient incapacity (fiscal and human-capital collapse) each inde- pendently pushed the portfolio in the same direction, so the functional transformation cannot be attributed to either side's strategy alone (Svoboda, 2024; Moura, 2025; Kosevich, 2023).

The third hypothesis, that absorption failure rather than sanctions was the decisive variable, is partially confirmed. The TCSI de- composition shows that the dimensions in- ternal to the transfer relationship — mainte- nance autonomy and technology absorption — were already weak (1.0 each) at the pro- gram's peak, so the arsenal lacked a survival mechanism before any sanction was im- posed; this supports the hypothesis. But the econometric evidence that sanctions account

for approximately half of the post-2017 oil-production losses (Rodríguez, 2022), and the cross-national evidence that sanctions strengthen militaries inside targeted regimes (Kiyani et al., 2025), establish sanctions as a genuine accelerant of both the fiscal collapse and the civil–military distortion. The defensible formulation is sequential: absorption failure made the program unsustainable in principle; the fiscal collapse and sanctions determined the speed at which unsustainability became inoperability.

The principal original contribution of this article is the Transferred-Capability Sustainability Index — the first composite metric that renders the sustainability of an arms-import-based modernization explicit, decomposable, and comparable across cases, and its first empirical application, which quantifies the Venezuelan collapse as a 57% decline (7.0 to 3.0) concentrated in financing continuity and human capital retention. The index converts a narrative literature into a measurement agenda: because each dimension is anchored to citable documentary indicators, the coding is replicable, contestable, and extensible to other import-dependent operators of Russian and Chinese equipment.

The limitations of the research are four-fold. First, the analysis relies on open sources in a case where neither the recipient nor the suppliers publish contract, budget, or serviceability data, so all quantitative anchors are institutional estimates rather than official figures. Second, the TCSI is scored by a single coder from a documentary record; inter-coder reliability testing and sensitivity analysis of the equal-weights assumption are tasks for subsequent work. Third, the two-period design compresses within-period variation — notably the 2014–2016 transition years —

that a yearly panel would expose. Fourth, the single-case application limits generalization: the index's discriminating power must be established on a comparative sample before its thresholds can be interpreted as more than descriptive.

Future research should proceed on three lines: application of the TCSI to a structured comparison of Russian-equipment operators under stress (Algeria, Belarus, Myanmar, Serbia, Syria before 2024) to test whether the Venezuelan decomposition pattern recurs; integration of the index with the network approach to arms transfers (Thurner et al., 2019) to model sustainability as a property of network position; and extension of the dual-use dimension to capture surveillance-technology transfers, which the Venezuelan case identifies as the characteristic post-collapse transfer category (Feldstein, 2019). For policy, the implications run in two directions. For states contemplating import-based modernization, the Venezuelan case demonstrates that the absorption components of a transfer package — maintenance localization, functioning licensed production, training pipelines — are not accessories to the deal but the deal itself; capability without them is rented, not owned (DeVore, 2021; Popov, 2024; Angelov, 2026). For states designing sanctions and engagement policy toward import-dependent autocracies, the TCSI decomposition identifies which levers act on which dimension — and warns that pressure on financing and platforms, while degrading conventional capability, predictably diverts the relationship toward the survival-services portfolio of sustinment, surveillance, and internal security whose principal victims are the recipient's own citizens (Kiyani et al., 2025; Feldstein, 2019; Rendon & Fernandez, 2020).

BIBLIOGRAPHY

- Akulina, O. (2025). Effectiveness of 250g-class FPV drones as a precision munition system in urban combat: Analysis of operational data from the Ukrainian battlefield 2022–2024. *Military Studies: Journal for Strategy, Technology and Defense Sciences*, 3(1), 23–47. <https://doi.org/10.65932/military-studies-2025-1-2>
- Ali, G. (2020). China–Pakistan conventional arms trade: An appraisal of supplier's and recipient's motives. *Pacific Focus*, 35(3), 530–553. <https://doi.org/10.1111/pafo.12175>
- Angelov, R. (2025). Civil control of the armed forces in Bulgaria between two decades of NATO membership: Institutional progress and residual democratic deficits. *Military Studies: Journal for Strategy, Technology and Defense Sciences*, 3(1), 101–125. <https://doi.org/10.65932/military-studies-2025-1-5>
- Angelov, R. (2026). Additive manufacturing of spare parts in military maintenance systems: A review of technological advances and logistical implications. *Military Studies: Journal for Strategy, Technology and Defense Sciences*, 4(1), 117–131. <https://doi.org/10.65932/military-studies-2026-1-8>
- Benali, M. (2025). Military industry and technology transfer: Civilian application of military innovations. *Military Studies: Journal for Strategy, Technology and Defense Sciences*, 3(2), 117–133. <https://doi.org/10.65932/military-studies-2025-2-9>
- Béraud-Sudreau, L., & Nouwens, M. (2021). Weighing giants: Taking stock of the expansion of China's defence industry. *Defence and Peace Economics*, 32(2), 151–177. <https://doi.org/10.1080/10242694.2019.1632536>
- Berg, R. C. (2024). *China and Russia engage Latin America and the Caribbean differently. Both threaten US interests*. Atlantic Council. <https://www.atlanticcouncil.org/in-depth-research-reports/issue-brief/china-and-russia-engage-latin-america-and-the-caribbean-differently-both-threaten-us-interests/>
- Boersner Herrera, A., & Haluani, M. (2023). Domestic and international factors of the contemporary Russo–Venezuelan bilateral relationship. *Latin American Policy*, 14(3), 366–387. <https://doi.org/10.1111/lamp.12309>
- Bove, V., & Böhmelt, T. (2021). Arms imports in the wake of embargoes. *European Journal of International Relations*, 27(4), 1114–1135. <https://doi.org/10.1177/13540661211037394>
- Bull, B., & Rosales, A. (2020). Into the shadows: Sanctions, rentierism, and economic informalization in Venezuela. *European Review of Latin American and Caribbean Studies*, (109), 107–133. <https://doi.org/10.32992/erlacs.10556>
- Bull, B., & Rosales, A. (2026). Chinese impact on development in Venezuela: The dynamics of structural stagnation. *New Political Economy*, 31(1), 125–144. <https://doi.org/10.1080/13563467.2025.2531004>
- Buxton, J. (2020). Continuity and change in Venezuela's Bolivarian Revolution. *Third World Quarterly*, 41(8), 1371–1387. <https://doi.org/10.1080/01436597.2019.1653179>
- Cardozo Uzcátegui, A., & Mijares, V. M. (2020). The versatile amalgam: Interests and corruption in Russia–Venezuela relations. *European Review of Latin American and Caribbean Studies*, (109), 181–202. <https://doi.org/10.32992/erlacs.10557>
- Chávez, K., & Swed, O. (2021). The proliferation of drones to violent nonstate actors. *Defence Studies*, 21(1), 1–24. <https://doi.org/10.1080/14702436.2020.1848426>
- Chindea, I. A., Treyger, E., Cohen, R. S., Curriden, C., Klein, K., Sanchez, C., Gramkow, H., & Holynska, K. (2023). *Great-power competition and conflict in Latin America* (Report No. RR-A969-4). RAND Corporation. https://www.rand.org/pubs/research_reports/RR969-4.html

- Congressional Research Service. (2025). *Venezuela: Political crisis and U.S. policy* (In Focus No. IF10230). Congressional Research Service. <https://crsreports.congress.gov/product/pdf/IF/IF10230>
- Corrales, J. (2020). Authoritarian survival: Why Maduro hasn't fallen. *Journal of Democracy*, 31(3), 39–53. <https://doi.org/10.1353/jod.2020.0044>
- DeVore, M. R. (2021). Armaments after autonomy: Military adaptation and the drive for domestic defence industries. *Journal of Strategic Studies*, 44(3), 325–359. <https://doi.org/10.1080/01402390.2019.1612377>
- Dominguez, F. (2024). The Venezuela–China strategic relationship and the building of a multi-polar world. *World Review of Political Economy*, 15(4), 582–610. <https://doi.org/10.13169/worldrevipoliecon.15.4.0582>
- Duarte Villa, R. (2022). Venezuelan military: A political and ideological model in Chavista governments. *Defence Studies*, 22(1), 79–98. <https://doi.org/10.1080/14702436.2021.1976061>
- Ellner, S. (2023). Objective conditions in Venezuela: Maduro's defensive strategy and contradictions among the people. *Science & Society*, 87(3), 385–413. <https://doi.org/10.1521/siso.2023.87.3.385>
- Feldstein, S. (2019). The road to digital unfreedom: How artificial intelligence is reshaping repression. *Journal of Democracy*, 30(1), 40–52. <https://doi.org/10.1353/jod.2019.0003>
- Fracalossi de Moraes, R. (2022). Arming a few dictators but not others: The politics of UK arms sales to Chile (1973–1989) and Argentina (1976–1983). *The British Journal of Politics and International Relations*, 24(2), 324–342. <https://doi.org/10.1177/13691481211033192>
- García-Guadilla, M. P., & Mallen, A. (2019). Polarization, participatory democracy, and democratic erosion in Venezuela's twenty-first century socialism. *The ANNALS of the American Academy of Political and Social Science*, 681(1), 62–77. <https://doi.org/10.1177/0002716218817733>
- Herbst, J. E., & Marczak, J. (2019). *Russia's intervention in Venezuela: What's at stake?* Atlantic Council. <https://www.atlanticcouncil.org/in-depth-research-reports/report/russias-intervention-in-venezuela-whats-at-stake/>
- IISS. (2025). *The military balance 2025*. Routledge. <https://doi.org/10.1080/04597222.2025.2445479>
- Jenkins, R. (2022). China's Belt and Road Initiative in Latin America: What has changed? *Journal of Current Chinese Affairs*, 51(1), 13–39. <https://doi.org/10.1177/18681026211047871>
- Jenne, N., & Martínez, R. (2022). Domestic military missions in Latin America: Civil-military relations and the perpetuation of democratic deficits. *European Journal of International Security*, 7(1), 58–83. <https://doi.org/10.1017/eis.2021.25>
- Kiyani, G., Liou, R. Y.-L., Murdie, A., & Peksen, D. (2025). Economic sanctions and civil-military relations in target countries. *Armed Forces & Society*, 51(1), 92–122. <https://doi.org/10.1177/0095327X231192359>
- Knežević, S. (2025). War reindustrialization of Europe: Defense industrial complexes as pillars of strategic autonomy. *Military Studies: Journal for Strategy, Technology and Defense Sciences*, 3(2), 9–28. <https://doi.org/10.65932/military-studies-2025-2-1>
- Kosevich, E. (2023). Russia-Venezuela relations (and US interests): A fully-fledged and long-term strategic partnership? *Russian Politics*, 8(4), 493–518. <https://doi.org/10.30965/24518921-00803010>
- Leiva Van de Maele, D. (2026). Explaining the belated US response to China's advances in Latin America. *International Affairs*, 102(3), 903–924. <https://doi.org/10.1093/ia/iia029>

- Locoman, E., & Papa, M. (2022). Transformation of alliances: Mapping Russia's close relationships in the era of multivectorism. *Contemporary Security Policy*, 43(2), 274–307. <https://doi.org/10.1080/13523260.2021.1994692>
- Malacalza, B. (2019). What led to the boom? Unpacking China's development cooperation in Latin America. *World Affairs*, 182(4), 370–403. <https://doi.org/10.1177/0043820019883251>
- Mehlretter, A. (2022). Arming for conflict, arming for peace? How small arms imports affect intrastate conflict risk. *Conflict Management and Peace Science*, 39(6), 637–660. <https://doi.org/10.1177/07388942211045940>
- Mehrl, M., & Thurner, P. W. (2020). Military technology and human loss in intrastate conflict: The conditional impact of arms imports. *Journal of Conflict Resolution*, 64(6), 1172–1196. <https://doi.org/10.1177/0022002719893446>
- Monaldi, F., Hernández, I., & La Rosa Reyes, J. (2021). The collapse of the Venezuelan oil industry: The role of above-ground risks limiting foreign investment. *Resources Policy*, 72, Article 102116. <https://doi.org/10.1016/j.resourpol.2021.102116>
- Moura, R. (2025). Profit or power: Determinants of Chinese financing to the developing world. *Journal of Contemporary China*, 34(152), 198–213. <https://doi.org/10.1080/10670564.2024.2343731>
- Pantić, M. (2025). Modeling the spread of disinformation in hybrid warfare: Application of complex network theory to campaigns in the Baltic region. *Military Studies: Journal for Strategy, Technology and Defense Sciences*, 3(2), 77–88. <https://doi.org/10.65932/military-studies-2025-2-6>
- Polga-Hecimovich, J. (2019). Bureaucratic politicization, partisan attachments, and the limits of public agency legitimacy: The Venezuelan armed forces under Chavismo. *Latin American Research Review*, 54(2), 476–498. <https://doi.org/10.25222/larr.142>
- Polga-Hecimovich, J. (2022). Venezuelan regional elections, democratic backsliding, and autocratization in the 2010s. *Regional & Federal Studies*, 32(4), 437–458. <https://doi.org/10.1080/13597566.2022.2063846>
- Popov, O. (2024). Offset arrangements as an instrument of technology transfer in combat-system procurement: A comparative evaluation of the fiscal efficiency of direct and indirect compensation models. *Military Studies: Journal for Strategy, Technology and Defense Sciences*, 2(1), 113–131. <https://doi.org/10.65932/military-studies-2024-1-7>
- Rendon, M., & Fernandez, C. (2020). *The fabulous five: How foreign actors prop up the Maduro regime in Venezuela*. Center for Strategic and International Studies. <https://www.csis.org/analysis/fabulous-five-how-foreign-actors-prop-maduro-regime-venezuela>
- Risojević, B. (2024). Economic multipliers of the domestic defence industry: An empirical analysis of the impact of arms exports on GDP of small Western Balkan economies (2019–2023). *Military Studies: Journal for Strategy, Technology and Defense Sciences*, 2(1), 44–60. <https://doi.org/10.65932/military-studies-2024-1-3>
- Rodríguez, F. (2022). Sanctions and oil production: Evidence from Venezuela's Orinoco Basin. *Latin American Economic Review*, 31, Article 33. <https://doi.org/10.60758/laer.v31.33>
- Rosales, A. (2019). Radical rentierism: Gold mining, cryptocurrency and commodity collateralization in Venezuela. *Review of International Political Economy*, 26(6), 1311–1332. <https://doi.org/10.1080/09692290.2019.1625422>
- Rouvinski, V. (2019). *Russian-Venezuelan relations at a crossroads*. Wilson Center. <https://www.wilsoncenter.org/publication/russian-venezuelan-relations-crossroads>
- Saar, J. (2025). Military professionalization and the civil-military gap in small NATO and partner states of southeast Europe: A longitudinal study, 2014–2023. *Military Studies: Journal for Strategy, Technology and Defense Sciences*, 3(1), 48–74. <https://doi.org/10.65932/military-studies-2025-1-3>

- Seelke, C. R., Nelson, R. M., Margesson, R., & Brown, P. (2022). *Venezuela: Background and U.S. relations* (CRS Report No. R44841). Congressional Research Service. <https://crsreports.congress.gov/product/pdf/R/R44841>
- SIPRI. (2025a). *Trends in international arms transfers, 2024* (SIPRI Fact Sheet). Stockholm International Peace Research Institute. <https://www.sipri.org/publications/2025/sipri-fact-sheets/trends-international-arms-transfers-2024>
- SIPRI. (2025b). *Trends in world military expenditure, 2024* (SIPRI Fact Sheet). Stockholm International Peace Research Institute. <https://www.sipri.org/publications/2025/sipri-fact-sheets/trends-world-military-expenditure-2024>
- SIPRI. (2025c). *SIPRI arms transfers database*. Stockholm International Peace Research Institute. <https://www.sipri.org/databases/armstransfers>
- Solar, C. (2023). Is Russia's war in Ukraine aiding the survival of the Venezuelan regime? *The RUSI Journal*, 168(1-2), 50–60. <https://doi.org/10.1080/03071847.2023.2195751>
- Svoboda, K. (2024). Russia's loans as a means of geoeconomic competition in Africa and Latin America. *Problems of Post-Communism*, 71(2), 156–166. <https://doi.org/10.1080/10758216.2022.2094808>
- Thoene, U., García Alonso, R., Dávila Benavides, D. E., Roa Sánchez, P. A., & Cuestas Zamora, E. (2023). Russia in Latin America: Why support Venezuela in a crisis? *International Social Science Journal*, 73(248), 627–639. <https://doi.org/10.1111/issj.12424>
- Turner, P. W., Schmid, C. S., Cranmer, S. J., & Kauermann, G. (2019). Network interdependencies and the evolution of the international arms trade. *Journal of Conflict Resolution*, 63(7), 1736–1764. <https://doi.org/10.1177/0022002718801965>
- To, E. M. Y.-H., & Acuña, R. (2019). China and Venezuela: South-South cooperation or rearticulated dependency? *Latin American Perspectives*, 46(2), 126–140. <https://doi.org/10.1177/0094582X18813574>
- Tonkonogiy, V. (2024). Additive manufacturing of critical spare parts for combat vehicles under conditions of logistical isolation: Technoeconomic validation of selective laser melting (SLM) application. *Military Studies: Journal for Strategy, Technology and Defense Sciences*, 2(1), 95–112. <https://doi.org/10.65932/military-studies-2024-1-6>
- Vadell, J. A. (2019). China in Latin America: South-South cooperation with Chinese characteristics. *Latin American Perspectives*, 46(2), 107–125. <https://doi.org/10.1177/0094582X18815511>
- Vuksanović, V. (2025). Kremlin looks southward: The logic of Global South in Russian foreign policy. *South African Journal of International Affairs*, 32(1-2), 133–154. <https://doi.org/10.1080/10220461.2025.2519982>
- Weitzman, A., & Huss, K. (2024). The Venezuelan humanitarian crisis, out-migration, and household change among Venezuelans in Venezuela and abroad. *Demography*, 61(3), 737–767. <https://doi.org/10.1215/00703370-11330409>
- Willardson, S. L., & Johnson, R. A. I. (2022). Arms transfers and international relations theory: Situating military aircraft sales in the broader IR context. *Conflict Management and Peace Science*, 39(2), 191–213. <https://doi.org/10.1177/0738894221992034>
- Xing, L., Vadell, J., & Rubiolo, F. (2023). Soft power with Chinese characteristics: Pandemic diplomacy in Latin America and the Caribbean. *Latin American Perspectives*, 50(4), 193–209. <https://doi.org/10.1177/0094582X231187895>
- Yueh, L. (2024). China's strategic lending policy: Implications for Latin America. *The Chinese Economy*, 57(4), 276–288. <https://doi.org/10.1080/10971475.2024.2350124>

MODERNIZACIJA NAORUŽANJA BOLIVARSKIH ORUŽANIH SNAGA: RUSKO-KINESKI TRANSFERI VOJNE TEHNOLOGIJE VENECUELI PRIJE I POSLIJE MADUROVOG PREUZIMANJA VLASTI

Rosa Hernandez Sanchez

Centralni univerzitet Venecuele
Karakas, Bolivarska Republika Venecuela
E-pošta: rosa.h.s.htj@fhe.ucv.ve

Originalni naučni članak

Primljeno: 10.02.2026. Prihvaćeno: 18.03.2026.

DOI: <https://doi.org/10.65932/military-studies-2026-2-1> UDK: 355.02:623.4](87)”20”

Sažetak: Venecuela je sprovela najambiciozniju vojnu modernizaciju u Latinskoj Americi početkom dvadeset prvog vijeka, apsorbujući približno 11 milijardi američkih dolara ruskih odbrambenih artikala između 2001. i 2013. godine i postavši najveći kupac ruskog naoružanja u zapadnoj hemisferi. Cilj ovog članka je da objasni zašto se program naoružavanja ovog obima pokazao strateški neodrživim, i da tu neodrživost izmjeri na ponovljiv način. Istraživanje primjenjuje mješoviti metodološki pristup koji kombinuje longitudinalnu analizu podataka o transferima naoružanja (SIPRI baza podataka o transferima naoružanja, IISS Military Balance), komparativnu analizu predmadurovskog (2005–2013) i madurovskog (2013–2025) perioda, i strukturiranu studiju slučaja ruskih i kineskih transfernih kanala. Originalni doprinos članka je Indeks održivosti transferisanih sposobnosti (TCSI), kompozitna metrika od pet dimenzija (kontinuitet finansiranja, autonomija održavanja, apsorpcija tehnologije, zadržavanje ljudskog kapitala, posvećenost isporučioaca) koja kvantifikuje stepen u kojem modernizacija zasnovana na uvozu preživljava prekid svojih omogućavajućih uslova. Primijenjen na Venecuelu, TCSI pada sa 7,0/10 u periodu 2005–2013 na 3,0/10 u periodu 2014–2025, što predstavlja pad od 57%. Ključni nalazi: isporuke glavnih konvencionalnih naoružanja pale su na gotovo nulu poslije 2016. godine; BDP Venecuele smanjen je za više od 80% između 2013. i 2020. godine, čime je uklonjena fiskalna osnova održavanja; do 2019. godine rusko specijalističko osoblje moralo je biti raspoređeno u Venecueli da bi ranije isporučena oprema uopšte ostala operativna. Članak zaključuje da venezuelanski slučaj demonstrira generalizabilnu tezu: modernizacija zasnovana na transferu naoružanja bez apsorpcije kapaciteta održavanja, proizvodnje i obuke proizvodi sposobnost koja je iznajmljena, a ne posjedovana, i koja propada brzinom političkog odnosa koji ju je finansirao.

Ključne riječi: *transferi naoružanja, Venecuela, Rusija, Kina, vojna modernizacija, apsorpcija tehnologije, održivost vojnih sposobnosti, TCSI.*