GLOBAL ARMS MARKET TRANSFORMATION AND THE RISE OF DRONE WARFARE: STRATEGIC LESSONS FROM UKRAINE'S EXPERIENCE

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Abstract

The full-scale invasion of Ukraine by the Russian Federation has triggered profound transformations in the global arms market. This study explores the dynamics of military spending in major regions, the strategic expansion of drone technologies, and the realignment of procurement priorities among NATO, Asian, and Middle Eastern countries. Special focus is placed on the development and combat deployment of unmanned aerial systems (UAS), their influence on tactical doctrines, and the emergence of Ukraine as a critical hub for drone warfare innovation. The article provides a comparative analysis of trends in conventional arms reduction and drone proliferation, highlighting technological leadership, regional asymmetries, and prospects for Ukraine's defence-industrial base.

Key words: arms market, unmanned aerial systems, military drones, global military spending, Ukraine, defence industry, NATO, FPV, AI warfare.

Introduction

Global military spending has entered a phase of accelerated growth following Russia's aggression against Ukraine. The traditional post-Cold War trend of declining defence budgets has reversed decisively. In 2022, global defence expenditure reached a record USD 2.24 trillion, representing 2.2% of global GDP. This growth was especially pronounced in Europe, where military budgets increased by 13%, driven by perceived threats from the east and the urgent need to rearm. The sharpest increases were recorded in Central and Eastern Europe, where countries such as Poland and the Baltic States launched ambitious procurement and rearmament programs.

This paper examines how the conflict in Ukraine has acted as a catalyst for broader shifts in the global arms trade and military procurement strategies. It focuses particularly on the rise of unmanned systems and drone warfare — a defining feature of 21st-century combat.

Result

Global Military Spending Trends, 2023–2024

According to SIPRI and OECD data, global defence spending continued its upward trajectory in 2023, surpassing USD 2.34 trillion — a 4.5% increase from 2022. The United States remained the top spender, allocating USD 877 billion, followed by China (USD 296 billion), Russia (USD 109 billion), and India (USD 81 billion). Ukraine's defence expenditure reached an estimated USD 45 billion, primarily funded through international assistance and domestic mobilisation.

The European Union, prompted by the ongoing war, launched several pan-European defence

initiatives, including the European Defence Fund (EDF) and the Rapid Deployment Capacity (RDC), allocating multi-billion euro packages to boost joint procurement. In Eastern Europe, Poland's defence budget rose above 4% of GDP in 2023, exceeding USD 35 billion and positioning Warsaw as NATO's eastern bulwark.

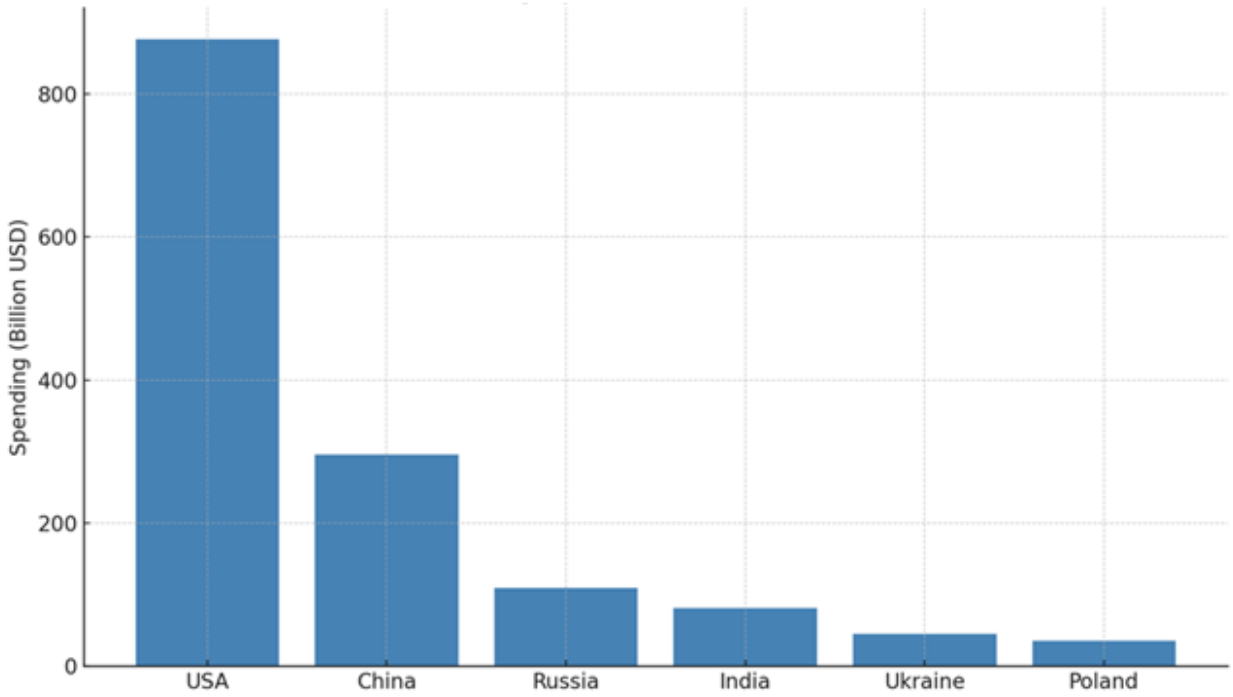

Figure 1: Global Military Spending 2023

Regionally, the Middle East saw a surge in procurement of air defence and drone interception technologies due to evolving threats from Iran and regional non-state actors. Asian defence budgets — particularly in Japan, South Korea, and Taiwan — responded to Chinese assertiveness with increased investment in missile defence and asymmetric deterrence capabilities.

Despite high spending levels, risks of inflation, public debt burdens, and fiscal sustainability have prompted countries to rethink procurement models. Increasing emphasis is placed on dual-use technologies, cost-effective innovation, and strategic autonomy through domestic arms industries.

The Global Drone Market: Structure, Technologies, and Strategic Actors

The global drone market has undergone a structural transformation over the past decade. As of 2023, the military drone segment is valued at over USD 14.1 billion, with projections indicating an expansion to approximately USD 35.6 billion by 2030 — growing at a compound annual growth rate (CAGR) of over 14% (Fortune Business Insights, 2023).

Modern drone technologies are classified by function (surveillance, strike, reconnaissance, logistics), platform type (fixed-wing, rotary-wing, hybrid), operational range (VLOS, EVLOS, BLOS), and autonomy level (remotely piloted, semi-autonomous, fully autonomous). The fixed-wing segment currently holds the largest market share due to its long endurance, payload capacity, and extended range.

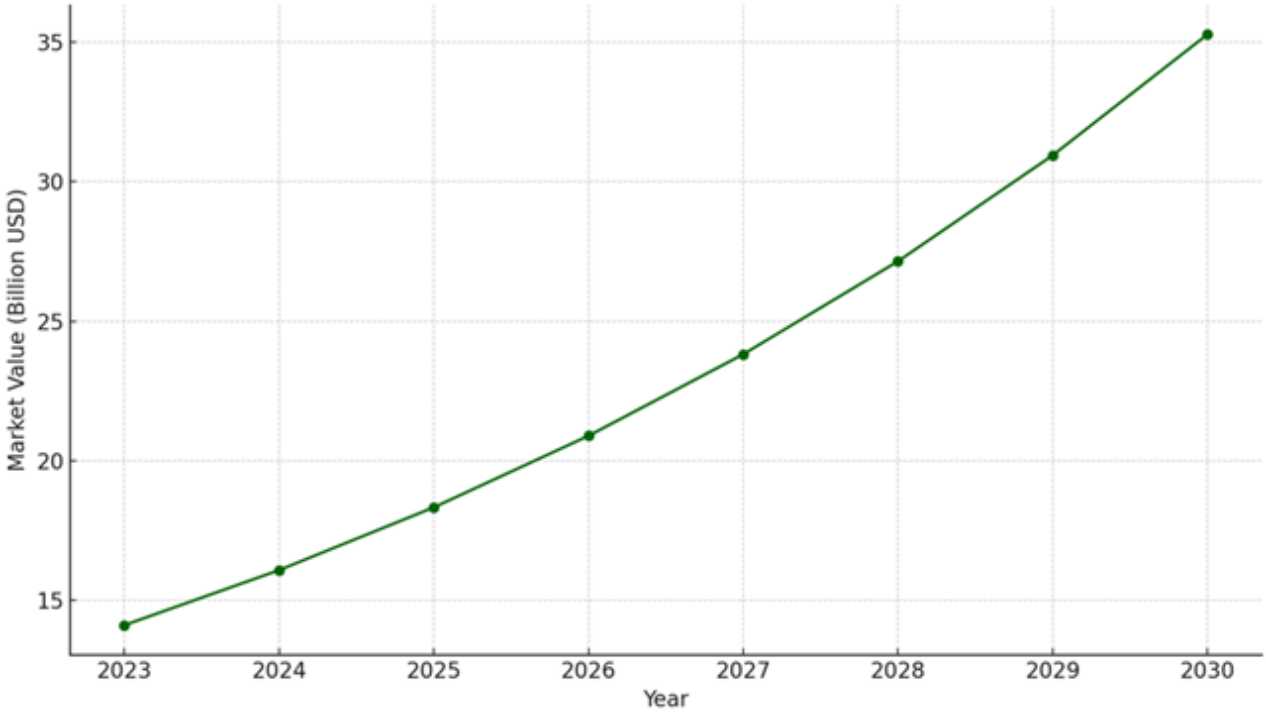

Figure 2: Military Drone Market Growth (2023–2030)

Combat use of drones has evolved beyond traditional intelligence, surveillance, and reconnaissance (ISR) roles. In the russia-ukraine war, both sides employ first-person-view (FPV) drones, loitering munitions (e.g., Lancet, Shahed-136), and maritime unmanned vehicles with devastating tactical effects. FPV drones in particular have emerged as a low-cost, high-impact solution for destroying armour, artillery, and fortifications.

Leading global drone producers include:

- **United States**: General Atomics, Northrop Grumman, AeroVironment — manufacturers of MQ-9 Reaper, Global Hawk, and Switchblade systems.
- **China**: AVIC, CASC, and CAIG — producers of Wing Loong, CH-4, and Cloud Shadow platforms.
- **Israel**: IAI and Elbit Systems — known for Heron, Hermes, and Skylark models.
- **Türkiye**: Baykar — producer of Bayraktar TB2 and Akıncı, used extensively in multiple theatres.
- **Europe**: Thales, BAE Systems, and Saab are expanding capabilities under EU and NATO umbrella programmes.

Ukraine has become a rapid innovator and mass producer of drones due to wartime necessity. Companies such as Ukrspecsystems (Shark), UA Dynamics (Punisher), and AeroDrone have pioneered reconnaissance, strike, and kamikaze UAS platforms adapted to the Eastern European battlespace. Ukraine has also developed effective maritime drones that challenged Russia's Black Sea Fleet, reshaping littoral warfare.

Ukraine as a Drone Innovation Hub and the Transformation of its Defence Industry

The war with russia has compelled Ukraine to rapidly develop indigenous defence capabilities, particularly in the unmanned systems domain. This process has not only accelerated technological innovation but also transformed Ukraine into a drone innovation hub with significant battlefield-tested applications.

Between 2022 and mid-2024, Ukraine expanded its domestic drone production ecosystem

dramatically. Over 200 companies are now engaged in the manufacturing, adaptation, and software integration of unmanned systems. Ukrainian firms such as Athlon Avia (Furia), DeViro (Leleka-100), Ukrspecsystems (Shark), and UA Dynamics (Punisher) have provided reliable tactical and operational UAS platforms. In parallel, grassroots innovations — such as the wide-scale militarization of commercial FPV drones — have enabled asymmetric tactics that neutralize expensive enemy hardware at minimal cost.

The Ukrainian government's Defence Tech initiative and the Brave1 platform, launched in 2023, institutionalized support for dual-use military technologies. These programs have provided funding, streamlined certification, and enhanced military-user feedback loops for rapid prototyping. Additionally, Ukraine's maritime drone capabilities — responsible for striking Russian naval vessels and ports — underscore a growing competence in unmanned naval warfare.

Yet, challenges remain. Ukraine's defence industry still depends on imported critical components (e.g., optics, microelectronics, propulsion systems). Vulnerabilities in logistics, R&D funding, and cybersecurity persist. Moreover, the sector faces competition for talent and material resources amid war-related constraints.

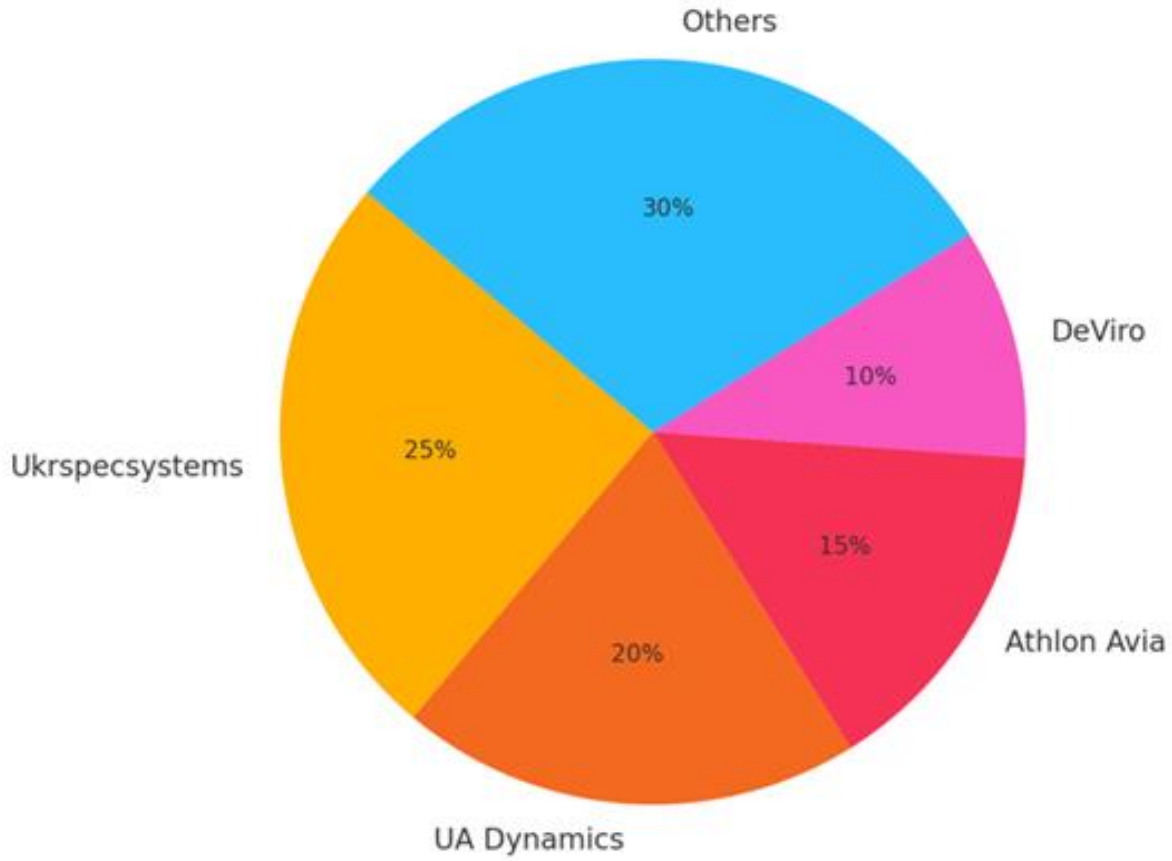

Figure 3: Share of Ukrainian Drone Producers (2024)

To ensure long-term sustainability, Ukraine's defence-industrial transformation must prioritize:

- greater integration with NATO's defence innovation ecosystem;
- local production of high-demand subsystems and electronics;
- public-private partnerships to scale production;
- intellectual property protection and export readiness;

- alignment with EU defence procurement mechanisms post-war.

Ukraine's success in drone warfare demonstrates that even under extreme duress, wartime innovation can reshape national defence sectors and offer a new paradigm of affordable, adaptive, and disruptive military power.

Conclusions

The evolution of the global arms market in the wake of Russia's war against Ukraine marks a paradigm shift in defence spending, technology adoption, and the decentralization of military innovation. Drone warfare, once a peripheral capability, is now a central pillar of contemporary armed conflict. The diffusion of FPV systems, loitering munitions, and autonomous aerial and maritime platforms reflects a move toward low-cost, high-precision, decentralized force application.

Ukraine has emerged not only as a battleground for testing modern technologies but also as an innovator, producing adaptable unmanned systems under extreme operational conditions. Its experience underscores the importance of institutional flexibility, agile procurement, and partnerships between state actors and private enterprise.

To align with global trends and ensure resilient security architecture, the following policy priorities are recommended:

1. Strategic Investment in Defence R&D: Dedicate sustained funding to high-tech innovation, particularly AI-enabled platforms and counter-UAS systems.

2. International Industrial Cooperation: Foster co-production and licensing agreements with NATO and EU partners to access advanced components.

3. Regulatory Reform and Incentives: Simplify procurement procedures, offer tax incentives, and support venture capital for defence start-ups.

4. Operational Integration: Embed UAS and autonomous platforms within national doctrinal frameworks and tactical education.

5. Export Development: Position Ukraine as a global supplier of cost-effective unmanned systems for asymmetric and mid-intensity conflicts.

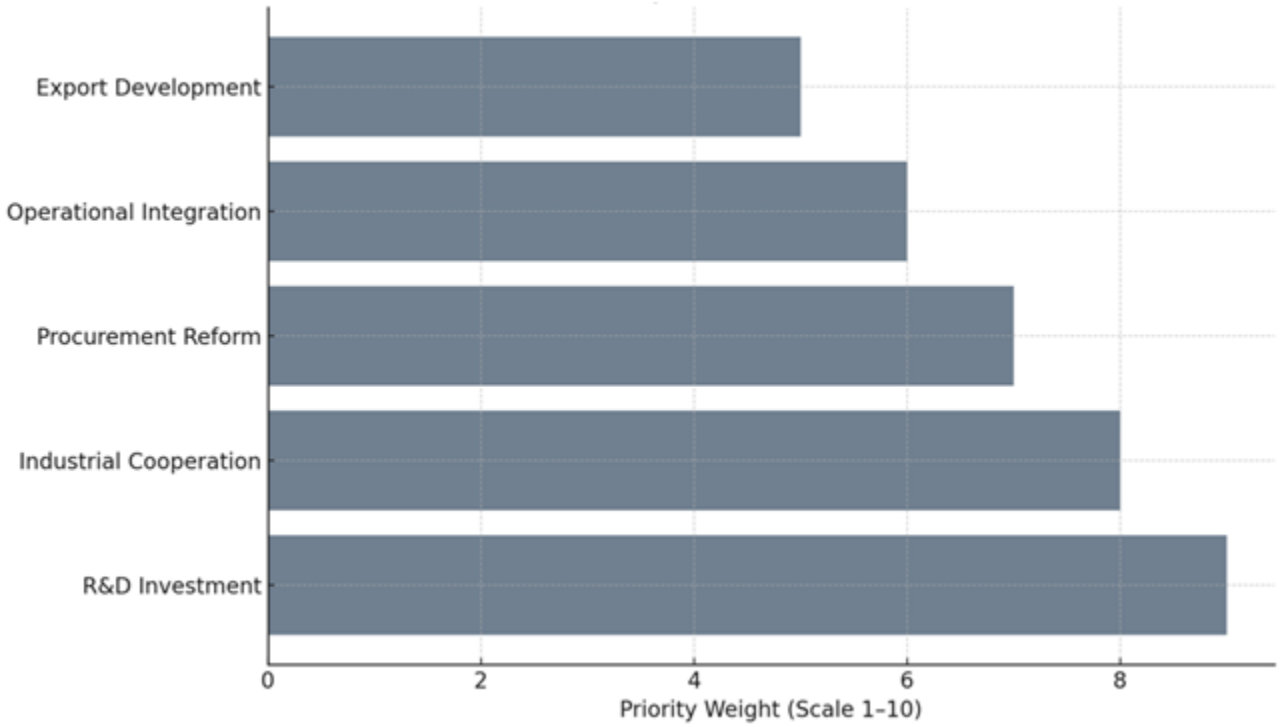

Figure 4: Policy Priorities for Ukraine's Defence Sector

Future conflict environments will likely be shaped by the ability of nations to adapt and innovate. Ukraine's wartime transformation provides valuable lessons for allied and partner nations seeking to modernize their defence ecosystems.

Use of AI tools declaration

The author declare they have not used Artificial Intelligence tools in the creation of this article.

Conflicts of interest

The author declares no conflicts of interest.

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