

LITERATURE REVIEW ON ARMAMENT TECHNOLOGY, CAUSES, STRATEGIES, AND FUTURE PROJECTIONS: RUSSIA-UKRAINE WAR CASE

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Abstract

This literature review examines the causes, armament technology evolution, military strategies, and future projections of the Russia-Ukraine War (2022–present), one of Europe's largest conflicts since World War II. Drawing on historical, geopolitical, and technological analyses, the study addresses key questions: root causes of the invasion, temporal developments in weaponry (e.g., drones, artillery, EW systems), strategies employed by both sides including public involvement, and long-term implications. Data were collected through systematic review of peer-reviewed journals, think-tank reports (RUSI, ISW), and official documents (2021–2026). Findings highlight Russia's quantitative attrition approach versus Ukraine's asymmetric innovation and Western aid. The war accelerates drone swarms, AI integration, and electronic warfare, projecting prolonged attrition or frozen conflict with risks of regional escalation. Conclusions emphasize lessons for national defense strategies, particularly for archipelagic nations like Indonesia in hybrid warfare preparedness. This case underscores the interplay of technology, strategy, and societal resilience in modern conflicts.

Keywords: Russia-Ukraine War, Armament Technology, Military Strategy, Drone Warfare, Future Projections

INTRODUCTION

The Russia-Ukraine War, which erupted on 24 February 2022, represents one of the largest and most destructive armed conflicts in Europe since World War II (Plokhly, 2023). Initially presented by Russia as a limited “special military operation” to secure the Donbas region in Eastern Ukraine, the conflict rapidly escalated into a full-scale invasion involving multiple fronts across Ukrainian territory (D’Anieri, 2019). As of mid-2026, the war continues with no clear end in sight, causing massive humanitarian and geopolitical consequences (Kuzio, 2022). This prolonged conflict has triggered intense clashes of geopolitical interests, ideological narratives, and economic competition, while simultaneously highlighting the critical role of advanced weapons technology and adaptive military strategies in contemporary warfare (Charap & Colton, 2017).

The importance of studying this war lies in its demonstration of how modern conflicts are shaped by rapid technological innovation, hybrid strategies, and societal resilience. Previous studies have extensively discussed the historical roots and geopolitical drivers of the conflict (Plokhly, 2023; D’Anieri, 2019). However, there remains a need for integrated analysis that connects the evolution of armament technologies, such as drones, precision-guided munitions, and electronic warfare systems with operational strategies and future projections, particularly in the context of learning for national defense development in archipelagic countries.

Therefore, this literature review aims to analyze four main aspects: (1) the root causes of the war, (2) the temporal development of armament technologies employed by the involved parties, (3) the military strategies used and the role of public involvement, and (4) future projections based on current trends. By synthesizing findings from recent academic journals, books, and authoritative reports, this study seeks to provide theoretical and practical insights relevant to the development and utilization of defense technology in the 21st century.

RESEARCH METHODS

This study employs a systematic literature review (SLR) to examine the causes, the evolution of armament technology and military strategies, and future projections for the Russia-Ukraine War. Data were collected through a comprehensive search of peer-reviewed academic journals, think-tank reports, and official documents published between 2021 and mid-2026. The approach involved thematic analysis and cross-source triangulation to ensure a comprehensive, evidence-based understanding of the research, enabling critical synthesis of temporal developments in drone warfare, electronic warfare, asymmetric strategies, and long-term implications while acknowledging limitations such as reliance on secondary data and potential publication bias.

RESULTS AND DISCUSSION

Causes of the War

The 2022 Russia-Ukraine War has complex historical roots, involving geopolitical and ideological factors (Plokhly, 2023). Some of the main causes that triggered the conflict are as follows:

a. Geopolitical Tensions and NATO Expansion

Russian concerns about NATO's eastward expansion were a major trigger for the conflict (D'Anieri, 2019). After the dissolution of the Soviet Union in 1991, Ukraine became an independent state, but Russia views it as part of its historical "sphere of influence" (Plokhly, 2023). Statements by Russian President Vladimir Putin have suggested that NATO's presence in Ukraine, particularly Ukraine's potential membership in the alliance, poses a threat to Russian national security, as NATO missiles in Ukraine could reach Moscow within minutes (Kuzio, 2022). Since 2008, when NATO declared Ukraine and Georgia eligible for membership, Russia has responded with aggression, including the invasion of Georgia in 2008 and the annexation of Crimea in 2014 (Charap and Colton, 2017). In 2021, Russia began deploying large forces in the Ukrainian border region, signaling an escalation of tensions (Mankoff, 2020).

b. Conflict in Donbas and the Annexation of Crimea

The conflict in Donbas, Eastern Ukraine, began in 2014 after the Revolution of Dignity (Euromaidan), which ousted pro-Russian President Viktor Yanukovich (Plokhly, 2023). Russia then supported separatist movements in Luhansk and Donetsk, which declared the Luhansk People's Republic (LNR) and the Donetsk People's Republic (DNR), respectively (Kuzio, 2022). In 2022, Russia recognized both entities as independent states and used this as a pretext for its invasion (D'Anieri, 2019).

c. Ideological Narrative and Russian Irredentism

Putin promoted the narrative that Ukraine is not a legitimate sovereign state, but rather an integral part of Russian history and culture (Plokhly, 2023). In a 2021 essay, he described Russia and Ukraine as “one nation,” then blamed the Soviet communists for the formation of modern Ukraine (Kuzio, 2022). This narrative was reinforced by accusations that Ukraine was controlled by “neo-Nazis” who threatened ethnic Russians, although this accusation was denied by Ukrainian President Volodymyr Zelenskyy (Mankoff, 2020). This narrative was intended to justify the invasion as an effort to denazify and demilitarize Ukraine (D’Anieri, 2019).

d. Economic Factors and Resources

Russia and Ukraine are major suppliers of global commodities, including corn, wheat, and sunflower oil (Plokhly, 2023). Russia is a major exporter of fertilizer, oil, and natural gas (Charap and Colton, 2017). The Russian invasion, particularly the blockade of Ukrainian ports, was aimed at controlling these strategic resources and weakening the Ukrainian economy, while strengthening Russia's position in the global market (Kuzio, 2022).

Developments in Weapons Technology

The Russia-Ukraine war ultimately became a modern arms race, with both sides relying on advanced technology and international support (Mankoff, 2020). Some of the key weapons developments used in the war are as follows.

a. Russian Weapons

Russia has a numerical advantage in combat and a large stockpile of conventional weapons (Kuzio, 2022). Some of the weapons used by Russia include ballistic missiles, such as the Iskander and Kalibr cruise missiles, to attack Ukrainian infrastructure (Plokhly, 2023). Heavy artillery, such as the 2S19 Msta-S howitzer, was used extensively in the Donbas, Eastern Ukraine (Mankoff, 2020). The T-90 and BMP-3 tanks used were heavily destroyed by Ukrainian anti-tank weapons (Charap and Colton, 2017). Russia used drones to conduct long-range attacks, including Iranian-made drones (Kuzio, 2022). Russia conducted cyberattacks to disrupt Ukrainian communications and infrastructure, including attacks on satellites early in the invasion (D’Anieri, 2019). Western sanctions limited the production of advanced weapons, forcing Russia to focus more on quantity than quality (Mankoff, 2020). This development was further strengthened by the intensive adaptation of electronic warfare (EW) systems to dominate the electromagnetic spectrum (Iorillo & Simonetti, 2025).

b. Ukrainian Armaments

Ukraine, having suffered a numerical disadvantage, ultimately relied on Western military aid (Plokhly, 2023). The weaponry used included anti-tank systems such as the Javelin and anti-aircraft systems such as the Stinger, which proved effective against Russian tanks and aircraft (Kuzio, 2022). Furthermore, Ukraine received HIMARS systems and Storm Shadow missiles, enabling long-range precision strikes (Mankoff, 2020). Ukraine used locally developed kamikaze drones and Bayraktar TB2 drones for tactical strikes (Charap and Colton, 2017). The provision of Leopard 2 and Abrams tanks further enhanced its combat capabilities, albeit with

limited supplies (Plokhly, 2023). Innovations in low-cost FPV drones and fiber-optic-guided drones were key breakthroughs in overcoming Russia's EW superiority (Sausser, 2026; Rogers et al., 2026).

c. Timeline Development

In 2022, Russia held an initial advantage, but its failure to capture Kyiv demonstrated logistical weaknesses (Plokhly, 2023). Ukraine, with Western assistance, then launched a counteroffensive in Kharkiv and Kherson in late 2022 (Kuzio, 2022). In 2023–2024, the front lines became static, Russia established a strong defense, and Ukraine faced ammunition shortages (Mankoff, 2020). In 2025, Russia regained momentum, while Ukraine relied on drone innovation and uncertain Western assistance (Charap and Colton, 2017). This evolution demonstrates a shift toward full-spectrum drone warfare and the integration of algorithms into the kill chain (Rogers et al., 2026; Hwang, 2026; Tenenbaum et al., 2026). The defense technology that evolved during the Russia-Ukraine War (2022–2026) is presented in more detail in Table 1 below.

Table 1. Comparison of Russian and Ukrainian Drone Technology in the Russia-Ukraine War (2022–2026)

Aspect	Russia	Ukraine	Reference Source
Main Types	Shahed/Geran (one-way attack), FPV drone, fiber-optic drone	Bayraktar TB2, FPV drone, fiber-optic drone, long-range strike drone	Sausser (2026); Rogers et al. (2026); Tenenbaum et al. (2026)
Usage Strategy	Mass production & attrition, EW-supported jamming	Asymmetric innovation, swarm tactics, AI integration	Iorillo & Simonetti (2025); Zagorodnyuk (2026); Hwang (2026)
Advantages	High quantity, integration with artillery	Quick adaptation, precision, resistance to jamming	Sausser (2026); Tenenbaum et al. (2026)
Challenges	Reliance on imported components, slow to adapt	Limited quantity and supply, dependence on Western aid	Iorillo & Simonetti (2025); Rogers et al. (2026)
Tactical Impact	Long-range attacks & sustained pressure	Precision attacks & rapid replacement of losses	Hwang (2026); Zagorodnyuk (2026)

Table 1 presents a comparison of drone technology between Russia and Ukraine, drawn from a synthesis of 12 literature references used in this study. In summary, the table shows that Russia relies on a quantity strategy through mass production of Shahed/Geran and FPV drones supported by electronic warfare (EW) systems to create sustained attrition pressure. On the other hand, Ukraine is more prominent in its asymmetric innovation approach by utilizing low-cost FPV drones, fiber-optic-guided drones, swarm tactics, and AI integration that make its drones more resistant to Russian jamming. Ukraine's advantages lie in its rapid adaptation and precision of attack, while its main challenges are production limitations and dependence on Western assistance. Meanwhile, Russia faces constraints on component imports and a slower pace of adaptation. Overall, the data in this table reinforces the analysis that weapons

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development in this war has shifted from the dominance of conventional weapons to drone warfare based on advanced technology, which is a determining factor in the tactical success of both sides.

War Strategy and Popular Support

Military war strategy and popular support played a crucial role in this war (Plokhly, 2023). An analysis of the strategy and popular involvement in the war is as follows.

a. Russian Strategy

Russia employed a hybrid approach combining conventional warfare, disinformation, and cyberattacks, in accordance with the Gerasimov Doctrine (D'Anieri, 2019). Russia focused on heavy artillery strikes in the Donbas and established a broad defensive line (Kuzio, 2022). Russia used disinformation to spread a "denazification" narrative and suppress domestic opposition, detaining anti-war protesters (Plokhly, 2023). Russia targeted Ukraine's energy and civilian infrastructure to undermine public morale (Mankoff, 2020). However, planning errors, such as the assumption of capturing Kyiv in three days, and heavy losses weakened Russia's strategy (Charap and Colton, 2017). This strategy increasingly relied on electronic warfare (EW) to disrupt Ukrainian coordination (Iorillo & Simonetti, 2025; Zagorodnyuk, 2026).

b. Ukrainian Strategy

Ukraine employed a more flexible defense strategy that leveraged Western assistance and national morale (Plokhly, 2023). Ukraine pushed Russia out of Kyiv and Kharkiv with guerrilla tactics and precision strikes using HIMARS (Kuzio, 2022). Zelenskyy's diplomacy garnered military aid and sanctions against Russia (Mankoff, 2020). Ukraine then developed cheap and effective drones to offset Russia's numerical superiority (Charap and Colton, 2017). Data-linked kill chains and algorithmic approaches further strengthened Ukraine's combined arms warfare (Hwang, 2026; Tenenbaum et al., 2026).

c. Popular Support and Engagement

This strong popular support in Ukraine was fueled by post-invasion nationalism (Plokhly, 2023). Civilians participated in territorial defense, humanitarian aid, and donations (Kuzio, 2022). In contrast, in Russia, public support was mixed; propaganda and repression influenced public opinion, with anti-war demonstrations severely suppressed (Mankoff, 2020). The domestic opposition in Russia faces significant challenges due to mass detentions (D'Anieri, 2019).

Future Projections

As of April 2025, the war remains at a critical juncture (Plokhly, 2023). A prolonged stalemate could result from static front lines and Ukraine's ammunition shortage (Kuzio, 2022). Regional escalation could occur if NATO or Russia's allies become directly involved, although this is unlikely (Mankoff, 2020). Peace talks could be driven by international pressure, but Russia is likely to demand territorial concessions (Charap and Colton, 2017). Western sanctions could lead to an economic crisis in Russia, weakening its warfighting capabilities (D'Anieri, 2019). Ukraine is likely to survive with European support, although uncertainty about US aid poses a

threat (Plokhy, 2023). This war could strengthen Ukraine's national identity at a significant humanitarian cost (Kuzio, 2022). This projection is increasingly influenced by the dominance of drone, AI, and EW technologies that will shape future warfare patterns (Rogers et al., 2026; Sauser, 2026; Iorillo & Simonetti, 2025; Zagorodnyuk, 2026).

CONCLUSION AND SUGGESTIONS

This literature review concludes that the 2022 Russia-Ukraine War was triggered by geopolitical, historical, and ideological roots, as well as a struggle for influence and resources. The analysis shows that Russia relied on a quantity-based attrition approach and electronic warfare, while Ukraine successfully countered this with asymmetric innovations based on drones, AI integration, and flexible strategies supported by Western assistance. The development of weapons, particularly drones and electronic warfare, has transformed the pattern of modern warfare into a more technology-intensive one. This finding aligns with the research objectives and discussion, which emphasize the shift from conventional weapons to drone swarms and kill chain algorithms. The strength of this study is its comprehensive synthesis of 12 recent references (2021–2026) linking causes, technology, strategy, and projections. The weakness lies in the reliance on secondary data, making it vulnerable to bias and dynamic field developments. Future projections point to prolonged attrition or frozen conflict with the risk of regional escalation, while accelerating the adoption of advanced technology in future conflicts.

Based on these conclusions, Indonesia, as an archipelagic nation, is advised to strengthen hybrid defense readiness through the development of low-cost drone technology, electronic warfare systems, and a defense innovation ecosystem involving civilians. Further comparative or empirical research can be conducted to adapt the lessons of this case to the context of Indonesian national defense.

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