Strategic Localization for Ukraine's Defense Industry

Стратегічна локалізація для оборонної промисловості України

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Received: October 6, 2024 | Revised: October 20, 2024 | Accepted: October 31, 2024

DOI: 10.33445/sds.2024.14.5.3

Purpose: to evaluate the options for strategic localization for the defence industrial sector of Ukraine and to provide practical recommendations for the implementation of the policy.

Method: comparative analysis, synthesis, and case studies.

Findings: Rebuilding Ukraine's degraded defence industry is vital for its long-term security and strategic interests, and a robust Ukrainian defence industry supports partner nation security interests as well. While continued foreign assistance remains essential in the short term, Ukraine needs to progressively localize repair, assembly, and repair capabilities for its most critical military equipment.

Theoretical implications: The paper enhances our understanding of key concepts relating to the contributions of the local defence industry to the security of Ukraine, and how those industries can be developed to support the capabilities of the Armed Forces of Ukraine. The Russia-Ukraine war serves as a contemporary case study to explore these theories in practice. The paper provides new insights for understanding the practical application of the policy of localization.

Value: Examining the practical implications of the policy of localization in Ukraine's defence industry in the context of the Russia-Ukraine war involves understanding how these theories translate into real-world recommendations, both for Ukraine and for its international partners. that can contribute to the development and sustainment of Ukraine's military capabilities.

Research limitations: The classification of much information relating to Ukraine's defence industry and defence capabilities, along with the contributions of international partners, forms a limitation on the scope and depth of the study.

Paper type: practical.

Key words: Ukraine defence industry, localization, Russia-Ukraine War, international military assistance, government-to-government, industry-to-industry.

Мета: оцінити варіанти стратегічної локалізації для ОПК України та надати практичні рекомендації щодо реалізації політики.

Метод дослідження: порівняльний аналіз, синтез і тематичні дослідження.

Результати дослідження: Відбудова деградованої оборонної промисловості України має життєво важливе значення для її довгострокової безпеки та стратегічних інтересів, а міцна українська оборонна промисловість також підтримує інтереси безпеки нації партнера. Хоча подальша зовнішня допомога залишається важливою в короткостроковій перспективі, Україні необхідно поступово локалізувати можливості ремонту, складання та ремонту свого найважливішого військового обладнання.

Теоретична цінність дослідження: Стаття покращує наше розуміння ключових концепцій, що стосуються внеску місцевої оборонної промисловості в безпеку України, а також того, як ці галузі можна розвивати для підтримки можливостей Збройних Сил України. Російсько-українська війна служить сучасним тематичним дослідженням для дослідження цих теорій на практиці. Стаття надає нові ідеї для розуміння практичного застосування політики локалізації.

Цінність: Вивчення практичних наслідків політики локалізації в оборонній промисловості України в контексті російсько-української війни передбачає розуміння того, як ці теорії перетворюються на реальні рекомендації як для України, так і для її міжнародних партнерів, які можуть сприяти розвитку та підтримці військового потенціалу України.

Обмеження дослідження: Класифікація великої кількості інформації, що стосується оборонної промисловості та оборонних можливостей України, разом із внеском міжнародних партнерів, створює обмеження щодо обсягу та глибини дослідження.

Тип статті: практична.

Ключові слова: українська оборонна промисловість, локалізація, російсько-українська війна, міжнародна військова допомога, від уряду до уряду, від галузі до галузі.

Introduction

Ukraine's defence industry has been severely degraded after years of neglect and extensive damage from the Russian invasion and now is largely incapable of meeting anything other than the most basic requirements. This has forced Ukraine into dependence on international assistance and – to a lesser degree–procurement of foreign defence equipment. However, boosting domestic defence repair and production capabilities is vital for its security and self-sufficiency as reliance on international donations will be insufficient to meet the nation's growing defence requirements. Ukraine must focus on the strategic localization of its defence needs by investing heavily in its

indigenous defence industrial base, and partner nations should support this initiative with funding, technology transfer, and cooperative production agreements.

Although the challenges facing Ukrainian defence industry are well known (Tkach, M., Hrytsyuk, Y., Tkachenko, V., & Kivliuk, O. (2023); Yurkiv, N., & Shemaev, V. (2023); Pysmennyi, O., Krechko, S., & Bestiuk, A. (2024); Nikitchenko, V., Hmyria, V., Kostiuk, O. (2024), and the need for localization has been addressed both in Ukrainian government policy statements (Ukraine will increase the localization, March 14, 2024) and in the media (Dmytro Pavlenko, October 10, 2023; Halyna Yanchenko, March 26, 2024), the concept has not been fully explored in the academic literature. Most academic literature published since the beginning of the full-scale invasion in February 2022 regarding this topic has focused on the need for reforms in the defence industrial sector. Stepan A. Davymuka addresses the ongoing innovation within the defence industrial sector, stressing the need for conception foundations of ecosystems to improve the technological level of Ukrainian arms production (Stepan A. Davymuka, 2023). Volodymyr Mozharovskyi and Serhii Hodz of the Central Research Institute of the Armed Forces of Ukraine address the need for centralization of the management of Ukrainian defense industry and the establishment of a State Agency for the Defense Industry of Ukraine (Mozharovskyi, V., & Hodz, S., 2024). Yuliia Kerpatenko fully discusses the importance of financial strategies in the development of the defence industrial sector (Yuliia Kerpatenko, 2024). Kateryna Stepanenko, George Barros, and Fredrick W. Kagan with Grace Mappes, Nicole Wolkov, Angelica Evans, and Christina Harward at the Institute for the Study of War address Ukraine's joint ventures and partnerships with western partners in the defence industrial sphere in "Ukraine's Long-Term Path to Success: Jumpstarting a Self-Sufficient Defense Industrial Base with US and EU Support" (Kateryna Stepanenko, January 14, 2024). S.V. Kovalevskyy, V.M. Osipov, and M.S. Kukosh address the issue of localization within the broader context of ensuring overall capability of the armed forces, arguing that the "gradual localization of Western technology production in Ukraine will contribute to reducing dependence on imports and increasing production volumes", also noting that the development of such localization opportunities, particularly with regard to service, repair, and restoration of weapon systems and military equipment can have a positive social and economic benefit by providing employment and the infusion of resources to local economies (Kovalevskyy, S.V., Osipov, V.M., Kukosh, M.S., 2023). This article seeks to expand the topic by addressing the context of localization, its requirements, practical applications, and policy approaches which would help ensure the implementation of this approach.

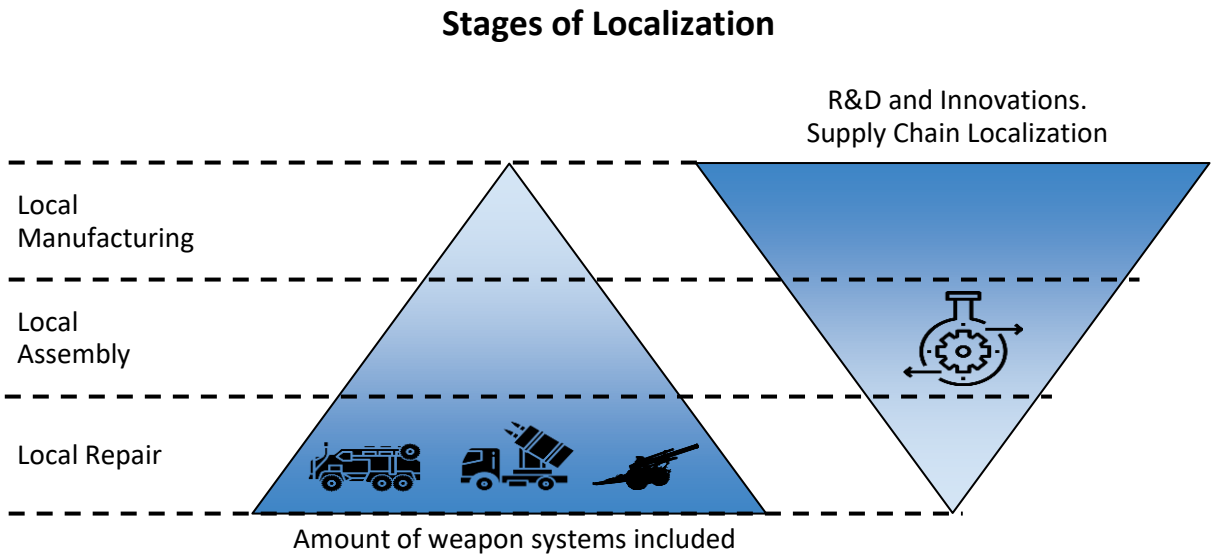
The United States, Ukraine's most generous supporter, has provided over USD 44.2 billion (U.S. Security Cooperation with Ukraine) in military assistance between January 24, 2022, and December 12, 2023, and seeks to continue supporting Ukraine's defence. But providing such support without a process of the localization of repair and manufacturing will be complicated, expensive, and logistically challenging. It will also impact Ukraine's ability to conduct sustained operations, as the requirement to return damaged equipment to repair facilities in Western Europe takes time, effort, and resources. Long-term development of the Ukrainian defence industry may help overcome these obstacles, but both countries lack experience cooperating on initiatives even during times of peace. Likewise, barriers around transfers of sensitive technology have hindered cooperation in the past and corruption, legal protections on intellectual property, and bureaucratic hurdles also remain significant impediments.

New policy solutions are required to enhance Ukraine's long-term defence capabilities and facilitate US-Ukraine defence industry cooperation. A bilateral initiative to establish localized production and repair facilities for key defence items in Ukraine would strategically drive cooperation. But regulatory barriers must be addressed, adequate financial and technical assistance provided, and anti-corruption measures prioritized to ensure success.

Such an effort would be best suited with three levels: local repair, local assembly, and local production. While many weapon systems can benefit from local repair, a smaller set would be

available for local assembly, and an even smaller set for local production. This tiered approach would ensure the Ukrainian Armed Forces can sustain its capabilities through the course of this conflict, while ensuring the Ukraine can begin to build the industrial capabilities necessary to respond to future conflicts.

Results



Local Repair

Many, if not most, of the weapon systems provided by the United States and other partners should be subject to local repair. Establishing in-country repair capabilities are needed to ensure high operational readiness and fast recovery of battle-damaged equipment. Local repair reduces cost and time compared to reliance on the remote maintenance and distribution cell in eastern Poland, known as the Tele-Maintenance and Distribution Center–Ukraine (TDC-U). While TDC-U provides an intermediary solution for much intermediate and depot level repair, localization of maintenance and overhaul for some priority equipment is still necessary. Starting with basic servicing, a phased approach to advance to rebuilds and overhauls of entire platforms is optimal. Investments in repair infrastructure, technical skills training, diagnostic equipment, and localized spare part stocks can increase the efficiency of foreign support.

Local Assembly

At the second level, a smaller group of weapon systems would be subject to local assembly. Again, through largely the same set of mechanisms, the U.S. government can encourage U.S. defence companies to partner with Ukrainian firms to create manufacturing facilities that can assemble weapon systems from materials and parts delivered from the U.S. Transitioning from the import of finished defence systems to domestic assembly using Semi Knock Down (SKD (Semi Knock Down) This refers to dismantling and packaging up certain parts of a system for shipment to other assembly plants where the parts will then be re-assembled) and Complete Knock Down (CKD (Completely Knocked Down) Refers to a product that is delivered in individual parts and then assembled on site) kits transfers product know-how and puts in place assembly lines. Assembly operations should focus on priority areas (see below). The skills and facilities established create a pathway towards local manufacturing.

Local Manufacturing

Licensed production, joint ventures, and technology transfers are key enablers for establishing local manufacturing capacity. Gradually increasing the locally produced content and value-addition should be mandated. Investments in machine tools, quality control systems, and certified production processes are critical. Building reliable local supply chains expands opportunities.

Research, Development, and Innovation

Ukraine has strong engineering talent and hands-on experience countering Russian military capabilities. The high equipment usage rates in Ukraine also help identify areas for improvement. Modifications and enhancements based on real-world experience can be scaled up and integrated into existing fleets globally. This enhances capabilities and survivability while leveraging Ukraine's skills. Collaborative research and development projects with allies should focus on rapid prototyping and testing of innovations that align with global requirements. Focused investments matched with strong intellectual property protections are essential to realize successful domestic products that can be exported.

Local Repair, Local Assembly, Local Manufacturing, and Research and Development

Some of what is proposed, particularly with regard to local repair, is being done already, but often without official sanction or support. BAE Systems, for example, is currently assessing five Ukrainian defence companies which are unofficially repairing its products following damage on the battlefield, with the view of picking one or more to serve as authorized BAE repair facilities. But an *ad-hoc* approach is insufficient and too slow. Ukraine needs a commitment by the U.S. government to encourage and assist these local repair facilities through Third Party Transfer approvals, provision of technical documentation and training, public-private partnerships with U.S. defence companies, and the establishment of a reliable mechanism for obtaining spare parts, would ensure the Ukrainian Armed Forces can adequately sustain these weapon systems for years.

Forms of Cooperation

There are various avenues for facilitating defence industry cooperation between the United States and Ukraine across government, industry, and multilateral domains. Bilateral government agreements can provide frameworks for collaboration. Domestic policies can incentivize industry partnerships. Direct industry relationships can enable technology transfers and joint ventures. Multilateral platforms can attract additional resources and diversify opportunities. Each option has its pros and cons.

Government-to-Government (G2G) Model

The United States has been the primary supporter of Ukraine's defence capabilities through direct G2G initiatives, including programs like Foreign Military Financing, Ukraine Security Assistance Initiative, and Presidential Drawdown. Thanks to this support, the Armed Forces of Ukraine (AFU) have acquired essential repair capabilities, benefiting from U.S. equipment, spare parts, and training. Strengthened self-sufficiency and repair capacity within the Ukrainian Armed Forces ensure high operational readiness and rapid recovery of battle-damaged equipment, underscoring the tangible impact of US-Ukraine defence industry collaboration.

Example of Cooperation: HMMWV Repair Capabilities

A notable example of defence industry cooperation is the establishment of the *5th Joint Electrogas Welding and Automobile Repair Center* at Zhytomyr, in central Ukraine. Through collaboration with the U.S., Ukraine gained advanced repair capabilities for HMMWV vehicles. This strategic localization ensured high operational readiness, sometimes surpassing even U.S. standards. The

partnership exemplifies the benefits of government-to-government cooperation, strengthening Ukraine's self-sufficiency in defence maintenance and enhancing mutual security interests.

A major advantage of the government-to-government model

A major advantage of the government-to-government model is the ability to channel substantial resources rapidly based on high-level commitments between the United States and Ukraine. This allows large-scale equipment, technical skills, and funding transfers directly to the Armed Forces of Ukraine, bypassing potential legal hurdles. Housing repair and maintenance capacities directly within military units, rather than private industry, enable agile fixing of battle-damaged equipment. The dedicated military-to-military cooperation structure facilitates the establishment of advanced repair centers for urgent operational needs.

A major limitation of the government-to-government model

A major limitation of this approach is that it focuses narrowly on building repair and overhaul capabilities rather than licensed production or manufacturing. Establishing localized production facilities is not a core military function and would require direct industry-to-industry or government-to-industry partnerships. The government-to-government model also relies heavily on political will and aligned priorities between both administrations. Changes in leadership or policies may disrupt cooperation. Additionally, flexibility to respond rapidly to emerging needs may be more restricted compared to private industry partnerships.

Government-to-Industry (G2I) Model

The Government-to-Industry model involves policies and incentives aimed at encouraging private defence companies in partner nations to collaborate, transfer technology, and jointly develop capabilities. This enables leveraging industry expertise for focused cooperation.

Example of Cooperation: US-Israel FMF support for domestic industry

Israel was first granted permission to use a portion of Foreign Military Financing (FMF) funds for domestic defence projects in 1977, supporting the development of the Merkava tank. Congress later allowed over $250 million in FMF to be spent in Israel on the Lavi fighter aircraft. By 1991, offsets reached 25% of total FMF. Legislation in 2009 enabled 26.3% of Israel's FMF to be spent on joint ventures and local production with US firms resulting in advanced projects like the F-35, which contains technology from Israeli Elbit Systems.

A major advantage of the government-to-industry model

The Government-to-Industry approach taps into the agility and innovation of private defence firms unconstrained by political bureaucracies. Companies can deliver rapid, targeted cooperation in areas of mutual commercial interest. Governments play an enabling role by incentivizing

partnerships through policies and funding mechanisms. This market-driven model allows outcomes to be shaped organically based on economic factors.

A major limitation of the government-to-industry model

A major limitation of the government-to-industry model is dependence on the business case for companies to commit resources. Many initiatives lack financial viability without committed government subsidies and incentives. There are also corruption risks associated with providing state funds to private Ukrainian firms. Additional bureaucratic steps may be required for approvals, such as third-party transfer permissions. Governments have less control over cooperation outcomes under this model than under direct participation models, so careful oversight is needed to ensure efficiency and sustained alignment with strategic priorities.

Industry-to-Industry (I2I) Model

The Industry-to-Industry model involves direct partnerships between private defence companies in the partner nations, with minimal government involvement. Collaboration is driven by commercial interests rather than political factors.

Example of Cooperation: L3Harris & Radio Satcom Group

L3Harris has partnered with Ukrainian company Radio Satcom Group to provide quick access to Harris products and certified repairs for Ukraine's military. L3Harris was considering localizing the radio production in Ukraine, but it required a long-term contract from Ukrainian defence forces – still unrealized – to make it financially viable.

A Major Advantage of the Industry-to-Industry Model

A key advantage of direct industry-to-industry cooperation is the ability to leverage market principles to shape partnerships based on aligned capabilities and incentives. Companies can cooperate rapidly without bureaucratic hurdles.

A Major Limitation of the Industry-to-Industry Model

A major limitation is government restrictions on technology transfers and war-related risks that prevent foreign firms from investing in Ukrainian production capacities. Partnerships under this model may not fully align with strategic national priorities, especially if government long-term plans are unclear. Sustaining cooperation requires strong commercial cases despite political headwinds.

Multilateral Frameworks

In addition to bilateral initiatives, Ukraine should more extensively utilize multilateral platforms to support its defence industry and military capability development, including:

- NATO Support and Procurement Agency (NSPA) – Using its international procurement mechanisms, it can provide vital spare parts and contracted maintenance/repair services to help sustain Ukraine's equipment fleets.
- NATO Trust Funds – Allow partner nations to jointly fund key cooperation projects with Ukraine. Relevant NATO-Ukraine trust funds cover areas like explosive ordnance disposal and counter improvised explosive devices (EOD/C-IED); small arms destruction; command, control, communications, and computers (C4); cyber defence; logistics standardization; and others.
- EU Defense Integration – Ukraine should pursue closer integration with European defence ecosystems, including cooperation with Polish and Central European defence industries and collaboration on PESCO projects.

- Multilateral Development Banks – Institutions like the European Bank for Reconstruction and Development can provide financing for major Ukrainian defence industry modernization projects.

Strategically leveraging these multilateral tools can attract additional resources, capabilities, and expertise to complement bilateral cooperation. But Ukraine needs to prioritize forums which provide the most significant impact on critical defence industry gaps.

Possible Areas of Future Cooperation

Initial strategic localization efforts of the US and Ukraine can focus on the following priority equipment areas:

HMMWVs:

- Ukraine operates around **2,000 HMMWVs** and has extensive experience sustaining and repairing them, achieving even higher operational readiness rates than the US.
- The US has stockpiles of excess HMMWV frames that could be transferred to Ukraine as donor vehicles for battle damage repairs. More may become available as the HMMWV gets phased out by the armed forces of the US and other countries.
- The HMMWV is reliable, flexible and has potential for the future upgrades.

MaxxPro MRAPs:

- Around **500 MaxxPros** operated by Ukraine provide protected mobility for personnel movement.
- The MaxxPro design uses bolted assemblies rather than welded armour. This enables rapid field repairs of battle damage without specialized tools.
- Ukraine could leverage this maintainability by localizing spare parts, repairs, and upgrades to keep MaxxPros operational.

M113 Armored Personnel Carriers:

- Ukraine has around **800 M113s** forming a large part of its mechanized forces.
- Many M113s and spares are available globally as the platform gets phased out of the inventory of most nations. More than 88,000 were produced since 1960. The M113's aluminum hull resists corrosion, meaning surplus systems available worldwide are likely in good condition.
- M113 is superior to Soviet BMPs and, despite the age, has a strong upgrade potential.

M777 Howitzers:

- Having around **160 M777s** and using it extensively on the frontline, self-sufficient local repair and ammo production is vital.
- Life extension programs on the howitzer fleet would maximize effectiveness.
- Opportunities exist to co-develop specialized ammunition variants.

Conclusion

Rebuilding Ukraine's degraded defence industry is vital for its long-term security and strategic interests, and a robust Ukrainian defence industry supports partner nation security interests as well. While continued foreign assistance remains essential in the short term, Ukraine needs to progressively localize repair, assembly, and repair capabilities for its most critical military equipment.

Recommendations for the Ukrainian Government

- Develop a national-level policy document framing International Defense Cooperation and strategic localization.
- Develop a strategy and an implementation roadmap aligning strategic localization goals with defence acquisition plans.
- Pass legislation to enable public-private partnerships and joint ventures in the defence industry.
- Create favourable tax conditions supporting Ukrainian production. Lift import taxes on manufacturing equipment and components for weapon production.
- Develop and implement a program for veterans' employment at defence companies.
- Improve national secrecy legislation to allow greater exchange of industrial information and to ensure an appropriate level of intellectual property and investment protection.
- Revise export control legislation to enable rapid military and dual-use goods movement, especially for defence production.
- Improve governance and implement robust anti-corruption mechanisms.
- Request localization initiatives as part of future security assistance packages to ensure long-term sustainability of Ukraine's defence requirements.

Recommendations for the US Government

- Establish a reciprocal defence industry cooperation agreement which includes expedited approval processes for joint initiatives with Ukraine.
- Incentivize US defence companies to engage in co-production, licensed production, and joint ventures in Ukraine.
- Allocate part of the Foreign Military Financing (FMF) budget to procure localized goods and services from Ukraine.
- Utilize US loan guarantees, grants, and public-private partnerships to facilitate investment in Ukraine's defence industry.
- Fund exchange programs and organize networking and study tours for industry representatives.
- Support localizing initiatives that are, among others, promoting veterans' employment.
- Use the seized Russian Central Bank reserves to guarantee investments in Ukraine's defence industry modernization.

Effective execution across these dimensions will enable the progressive development of strategic localization initiatives. But political will, stakeholder alignment, and resolute

implementation will be critical for success. The window for impactful cooperation is now. Ukrainian and allied policymakers must seize the opportunity to rebuild Ukraine's defence industrial base through partnerships at each level – laying the foundations for the sovereignty of Ukraine and strategic security in Europe.

Funding

This study received no specific financial support.

Competing interests

The authors declare that they have no competing interests.

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