ЕКОНОМІЧНІ ПРОБЛЕМИ СТАЛОГО РОЗВИТКУ НАЦІОНАЛЬНОЇ ЕКОНОМІКИ

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STRATEGIC DEVELOPMENT PRIORITIES FOR THE DEFENSE-INDUSTRIAL COMPLEX OF UKRAINE

The article explores strategic transformation vectors for Ukraine's defense-industrial complex (DIC) amid global security challenges. The study aims to justify development priorities ensuring technological leadership and integration into the global safety market. Using systems and comparative analysis, the research compares traditional management with agile methodologies tested in combat. Key results include a new "network-centric" paradigm based on digital twins, institutional reforms, and Lean-Agile methods. Practical value lies in recommendations for modernization, attracting foreign investment, and forming MilTech clusters.

Keywords: *strategic development, defense-industrial complex, enterprise, management.*

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СТРАТЕГІЧНІ ПРІОРИТЕТИ РОЗВИТКУ ОБОРОННО-ПРОМИСЛОВОГО КОМПЛЕКСУ УКРАЇНИ

Стаття присвячена дослідженню стратегічних векторів трансформації вітчизняного оборонно-промислового комплексу (ОПК) в умовах глобальних безпекових викликів та активної фази збройної агресії. Актуальність теми зумовлена необхідністю переходу від застарілих радянських управлінських моделей до інноваційних підходів, що відповідають стандартам НАТО та вимогам концепції Індустрії 4.0. Метою роботи є визначення та обґрунтування ключових пріоритетів стратегічного розвитку підприємств оборонної галузі, які забезпечать їхню стійкість, технологічну першість та інтеграцію у світовий ринок безпеки. Методологічну базу дослідження становлять методи системного аналізу, стратегічного планування та компаративного аналізу. Застосовано підхід до вивчення кейс-стаді успішної міжнародної кооперації та інвестиційних трендів у секторі DefenseTech. Аналітичний інструментарій дозволив зіставити ефективність традиційних каскадних моделей менеджменту із сучасними гнучкими методологіями, що проходять апробацію безпосередньо в умовах ведення бойових дій. У результаті дослідження сформовано нову парадигму «мережево-центричного оборонного виробництва», яка базується на чотирьох стратегічних стовпах. По-перше, доведено критичну роль цифрової екосистеми та впровадження «цифрових двійників» для прискорення циклів розробки озброєння. По-друге, обґрунтовано необхідність інституційної реформи через корпоратизацію та прозоре управління за стандартами ОЕСР. По-третє, розкрито потенціал впровадження методів Lean та Agile, що забезпечують прямий зв'язок між інженерними рішеннями та потребами фронту. По-четверте, визначено пріоритетність інвестицій у людський капітал та цифрову кодифікацію бойового досвіду через механізми «цифрових ниток». Окрему увагу приділено трансформації логістичних ланцюгів від моделі ефективності до моделі максимальної стійкості (resilience). Практична цінність роботи полягає у можливості використання запропонованих рекомендацій органами державного управління та керівництвом оборонних підприємств для розробки стратегій модернізації, залучення прямих іноземних інвестицій та формування технологічних кластерів. Висновки статті можуть слугувати базою для вдосконалення нормативно-правового поля у сфері оборонних закупівель та стимулювання розвитку приватного сектору MilTech в Україні.

Ключові слова: *стратегічний розвиток, оборонно-промисловий комплекс, підприємство, управління.*

Problem statement. In the current environment of global instability and rapid technological progress, traditional management approaches in the defense-industrial complex (DIC) require a fundamental overhaul. Rigid hierarchical structures and long, closed cycles of weapon development are becoming ineffective against hybrid threats and dynamic changes in the security landscape. For Ukraine, which is engaged in a full-scale war, the transformation of the DIC management system is of existential importance, as national resilience directly depends on the industry's ability to integrate digital solutions, agile methodologies, and the latest corporate governance standards. Thus, defining strate-

gic priorities for the development of the defense sector is a critical task for ensuring the state's defense capability and its further integration into the global security market.

Analysis of recent research and publications. The strategic transformation of the DIC under high-intensity combat conditions is a focal point for scholars such as V. Horbulin [1, 4], who substantiates the concept of technological superiority, and V. Koval [2], who focuses on intelligent planning systems. The creation of innovative ecosystems and the development of MilTech clusters are analyzed in detail in the works of K. Kyzymenko and M. Kravchenko [3].

Meanwhile, aspects of international cooperation and the transition to NATO standards are addressed in reports by the RAND and CSIS analytical centers.

However, existing research often remains fragmentary and requires systematization regarding the strategic development of DIC enterprises amidst global transformations.

Formulating the purposes of the article. The goal of the article is to identify the key priorities for the strategic development of Ukraine's defense-industrial complex, involving transformational changes in management systems and approaches to governing enterprises in the sector.

Presentation of the main research material. Current global threat dynamics and technological advancements dictate new rules for the DIC, which in turn determine the shift in strategic management approaches. The demand for flexibility and speed of response means that traditional hierarchies and closed development cycles are no longer relevant. Today, the strategic resilience of the DIC directly depends on the industry's ability to shift toward agile, networked, and digital management models. For Ukraine, this transformation is existential: the country is not merely adapting foreign technologies but is evolving into a global R&D hub for defense innovations tested in real combat.

Four key priorities for management renewal should be highlighted:

1. Digital Ecosystem and Industry 4.0

The foundation for modernizing production is the total digitalization of the weapon lifecycle. The priority is shifting toward a unified management ecosystem based on AI, Big Data, and IoT.

The concept of Digital Twins is becoming an industry standard, allowing for the modeling of equipment behavior and optimization of production lines before physical implementation.

Forecasts suggest [5] the global digital twin market will grow from €16.55 billion in 2025 to over €242 billion by 2032 (CAGR 39,8%). For the Ukrainian DIC, this is a path to radically reducing R&D costs and accelerating the delivery of weapons to the front.

2. Institutional Reform and Corporate Governance

Transitioning from Soviet-era models to OECD and NATO standards is a prerequisite for global market integration.

Corporatization is exemplified by the transformation of Ukroboronprom into JSC "Ukrainian Defense Industry" [6], involving independent supervisory boards to ensure transparency for foreign investors.

Furthermore, the consolidation of procurement functions (DOT and the Defense Procurement Agency) by 2026 [7] aims to eliminate corruption and functional duplication. The success of the DOT-Chain digital platform has already demonstrated the efficiency of this approach.

3. Transition to Agile Methodologies (Lean & Agile)

Under hybrid warfare, the linear "Waterfall" model is too slow. The priority is Lean (resource optimization) and Agile (rapid response to front-line requests). This enables replacing multi-year cycles with short iterations for creating MVPs (Minimum Viable Products) through direct communication between engineers and soldiers.

The potential of using Industry 5.0 and AR tools has an important impact on the strategic development of defense industry enterprises. The use of augmented reality in the workplace allows for rapid training of new personnel and minimizing shortages during the assembly of complex components, which is critically important in the context of mobilization processes.

4. Investment in Human Capital and Knowledge Codification

The main challenge for Ukrainian defense industry enterprises at this stage remains the personnel shortage. The modern defense industry needs "universal soldiers" – specialists who possess knowledge in IT, engineering and strategic management at the same time. To solve these challenges, it is worth using opportunities in two directions:

1. Educational clusters: the creation of our own scientific lyceums and programs (using the experience of Baykar and JSC "UOP") should become a strategic investment in the future of the industry.

2. Knowledge management: unique combat experience should be transformed from "rumors" into digital databases (Digital Threads). This allows us to maintain critical expertise and ensure continuous improvement of weapons regardless of personnel rotation.

A comparison of the traditional model of strategic management and the innovative model, which forms the basis of promising strategic development for future periods, is given in Table 1.

The strategic development of defense industry enterprises is implemented in conditions of high risk, which

Table 1

Comparison of traditional and innovative models of strategic management of defense-industrial complex enterprises

Characteristic	Traditional Model	Innovative Model (Industry 4.0/5.0)
Management Structure	Rigid hierarchy, centralized decisions.	Flexible network structure, autonomous teams.
Development Cycle	Waterfall: years from specs to series.	Iterative (Agile): MVP release and constant updates.
Data Management	Paper-based, isolated databases.	Big Data ecosystem, AI, and "digital threads."
Design/Prototyping	Physical prototypes, expensive testing.	Digital Twins, virtual tests.
Production	Static assembly lines.	Smart factories, 3D printing, AR support.
Feedback	Official reports after long intervals.	Real-time interaction between engineers and military.
Human Capital	Narrow engineering specialization.	Multidisciplinarity (Engineering + IT + Management).
Procurement	Fragmented, corruption risks.	Centralized, digital transparency.

Source: developed by the author

requires the formation of approaches to managing the sustainability of industry enterprises. In this context, an important strategic direction is the integration of Ukrainian defense industry enterprises into global value chains, including the transfer of production facilities to the territory of Ukraine, closer to the front line. Table 2 lists the most significant international cooperation projects.

Developing cooperation with international partners requires improving supply chain management and increasing their resilience.

The war in Ukraine revealed critical vulnerabilities in the global Just-in-Time supply model. Modern defense industry management is shifting the emphasis to "resilience over efficiency". Studies from 2025–2026 [12] identify several architectural solutions to increase the survivability of supply systems: diversification of routes, creation of strategic buffers, and localization of critical production (Table 3).

To ensure the strategic development of the DefenseTech sector, in addition to the transformation of management approaches aimed at state strategic planning, it is necessary to create prerequisites for activating the attraction of venture capital. In Ukraine, this role is currently performed by the Brave1 coordination platform, which unites over 3,500 developments and provides grant support in the amount of over 1.3 billion hryvnias [13]. The Brave1 management model is based on "quality gates" – projects undergo rigorous defense expertise and codification according to NATO standards before receiving funding.

An analysis of changes in the system of generating innovative ideas and developments that occurred during 2025 shows that there is a transition from single developments to the formation of full-fledged technological clusters. The most dynamic areas are autonomous systems (drones), electronic warfare means, and AI solutions for battlefield analysis. Attracting private capital to these projects has become a massive phenomenon: in 2025, over 100 million US dollars of investment was invested in Ukrainian defense startups [13].

Table 4 presents the areas of innovative projects and the volume of investments that form the overall innovation and investment landscape.

Conclusions. Thus, the conducted study of priority areas of strategic development of enterprises of the defense-industrial complex indicates the formation of a new management paradigm – "network-centric defense production", which combines deep digital integration, flexibility and speed and global cooperation and sustainability.

The main priorities of strategic development cover such areas as:

– Digital transformation: The implementation of Industry 4.0 technologies, in particular the concept of "digital

Table 2

Key International Joint Ventures and Production Projects, 2025–2026

Partner	Country	Type of Cooperation	Subject of Production
Rheinmetall	Germany	Joint Venture (UDI)	Armored vehicles (Lynx, Fuchs), Leopard repairs.
BAE Systems	UK	Localization & Licensing	L119 Howitzers, 155mm shells (in Poland).
Baykar	Turkey	Direct Investment ($100M)	Plant in Kyiv region (TB2, TB3, Akinci).
Nammo	Norway	Technology Transfer	155mm ammunition, warheads, fuel.
Northrop Grumman	USA	Co-production	Artillery ammunition, innovative casting.

Source: compiled by the author based on [8–11]

Table 3

Strategic measures to increase the resilience of supply chains in the defense industry

Category	Management mechanism	Expected effect
Diversification	Attracting suppliers from different geographical areas (near-shoring).	Reducing the impact of blocking individual corridors
Reservation	Creating excess capacity and warehouse stocks	Maintaining production rates during short-term disruptions
Codification	Transition to NATO standards for component interchangeability	Ability to quickly replace suppliers from partner countries
Vertical Integration	Production of key components (e.g. engines) domestically	Reducing import dependence
Energy Independence	Implementation of distributed generation at production facilities	Minimizing downtime during power system strikes

Source: compiled by the author

Table 4

Innovation and investment landscape and key players Ukrainian MilTech 2025

Company / Project	Specialization	Investment volume ($ million)	Key achievements
Swarmer	AI for UAV Swarm Control	15,0	Coordination of up to 100 drones simultaneously
HIMERA	Secure Digital Communications	3,2 (totally)	Scaling the production of radio stations
Dropla Tech	AI for Mine Clearance	2,6	Automatic mine detection from the air
Bavovna.ai	Navigation Without GPS	1,5	Working in conditions of intense electronic warfare
Tencore	Defense Platforms	3,7	Partnership with the MITS accelerator
Sky Spy	Airspace Monitoring	1,6	Sensors for detecting targets at low altitudes

Source: compiled by the author based on [14]

twins", is becoming a mandatory standard, which allows reducing R&D costs and accelerating the path of weapons from the project to the front.

– Institutional renewal: Corporate governance reform and centralization of procurement (through DOT-Chain and the merger of agencies) create a transparent environment necessary for attracting foreign investment and creating joint ventures with global leaders such as Rheinmetall or BAE Systems.

– Management flexibility: The transition from cascade models to Lean and Agile ensures operational modernization of equipment based on direct feedback from the battlefield.

– Supply chain sustainability: Awareness of the vulnerability of the just-in-time model stimulates the deve-lopment of strategies for redundancy, diversification, and localization of production of critical components within the country.

The implementation of these priorities will allow the Ukrainian defense industry not only to successfully counteract aggression, but also to become a powerful technological hub capable of exporting unique management and defense innovations at the global level.

Further research requires specifying mechanisms for ensuring the effectiveness of the strategic development of defense-industrial complex enterprises within the outlined areas.

References:

1. Horbulin V.P., Mosov S.P. Unmanned military aviation is the focus of global scientific and technological progress. *Visn. Nac. Akad. Nauk Ukr.* 2023. No. (11): pp. 48–56. DOI: https://doi.org/10.15407/visn2023.11.048

2. Koval V. (2025). Strategic Analysis of the Transformation of Ukraine's Defense Industry Under the Influence of Military Threats and Global Technological Changes. *Social Development and Security,* No. 15(4), pp. 306–314. DOI: https://doi.org/10.33445/sds.2025.15.4.26

3. Kyzymenko K., Kravchenko M. Development of the model of innovation ecosystem for defense enterprises of Ukraine. *Economic Bulletin of NTUU "Kyiv Polytechnical Institute".* 2021. Vol. 19. P. 212–216 DOI: https://doi.org/10.20535/2307-5651.19.2021.252610

4. Akademik Volodymyr Horbulin i viiskovyi ekspert Valentyn Badrak – pro try stsenarii dlia Ukrainy ta svitu na 2026 rik [Academician Volodymyr Horbulin and university expert Valentyn Badrak – about three scenarios for Ukraine and the world for 2026]. Available at: https://www.nas.gov.ua/news/akademik-volodimir-gorbulin-i-viyskoviy-ekspert-valentin-badrak--pro-tri-scenari-dlya-ukrani-ta-svitu-na-2026-rik (accessed February 13, 2026).

5. 2025 Digital Twin Statistics. Available at: https://hexagon.com/resources/insights/digital-twin/statistics (accessed February 13, 2026).

6. Uriad pryznachyv nahliadovu radu dlia AT "Ukroboronprom" [The government appointed a supervisory board for JSC "Ukroboronprom"]. Available at: https://www.kmu.gov.ua/news/uriad-pryznachyv-nahliadovu-radu-dlia-at-ukroboronprom (accessed February 13, 2026).

7. Denys Shmyhal: Minoborony obiednuie kliuchovi oboronni pidpryiemstva ta formuie novi nahliadovi rady s 1 sichnia [Denys Shmyhal: The Ministry of Defense is uniting key defense enterprises and forming new supervisory boards from January 1]. Available at: https://armyinform.com.ua/2025/12/03/denys-shmygal-minoborony-obyednuye-klyuchovi-oboronni-pidpryyemstva-ta-formuye-novi-naglyadovi-rady-z-1-sichnya/ (accessed February 13, 2026).

8. A powerful partner at Ukraine's side | Rheinmetall. Available at: https://www.rheinmetall.com/en/media/stories/2023/rheinmetall-a-powerful-partner-at-ukraine-side (accessed February 13, 2026).

9. Tooling up together: How Europe and Ukraine can improve ... – RAND. Available at: https://www.rand.org/content/dam/rand/pubs/research_reports/RRA3800/RRA3833-4/RAND_RRA3833-4.pdf (accessed February 13, 2026).

10. Build in Ukraine: an initiative driving the localization of international ..., Available at:: https://mod.gov.ua/en/news/build-in-ukraine-an-initiative-driving-the-localization-of-international-companies-in-ukraine (accessed February 20, 2026).

11. BAYKAR Remains Global UCAV Export Leader in 2025. Available at: https://baykartech.com/en/press/baykar-remains-global-ucav-export-leader-in-2025/ (accessed February 20, 2026).

12. Supply-Chain Warfare in Ukraine: Threat Architecture, Critical. Available at: https://debuglies.com/2026/01/02/supply-chain-warfare-in-ukraine-threat-architecture-critical-vulnerabilities-and-resilience-measures-up-to-january-2-2026/ (accessed February 20, 2026).

13. Brave1 – information about the project Brave1 – Digital State UA. Available at: https://digitalstate.gov.ua/projects/tech/brave1 (accessed February 20, 2026).

14. Top-10 ukrainskykh miltech-startapiv, shcho zaluchyly naibilshe investytsii u 2025 rotsi [Top 10 Ukrainian miltech startups that attracted the most investments in 2025]. Available at: https://dev.ua/news/top-10-ukrainskykh-miltech-startapiv-shcho-zaluchyly-naibilshe-investytsii-u-2025-rotsi-1767084704 (accessed February 20, 2026).

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